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TIA/EIA/IS-95-A

# **TIA/EIA INTERIM STANDARD**

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## **Mobile Station-Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System**

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### **TIA/EIA/IS-95-A**

(Revision of TIA/EIA/IS-95)

MAY 1995

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**TELECOMMUNICATIONS INDUSTRY ASSOCIATION**



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**PREFACE**

1  
2 These technical requirements form a compatibility standard for cellular mobile telecom-  
3 munications systems. They ensure that a mobile station can obtain service in any cellular  
4 system manufactured according to this standard. These requirements do not address the  
5 quality or reliability of that service, nor do they cover equipment performance or  
6 measurement procedures.

7 To ensure compatibility (see Note 1), both radio-system parameters and call-processing  
8 procedures must be specified. The equipment and interface parameters commonly  
9 encountered in two-way radio systems have been updated and expanded to reflect the  
10 unique radio plan upon which cellular systems are based. The sequence of call-processing  
11 steps that the dual-mode mobile stations and base stations execute to establish calls has  
12 been specified along with the digital control messages and analog signals that are  
13 exchanged between the two stations.

14 The base station is subject to fewer compatibility requirements than the dual-mode mobile  
15 station. Radiated power levels, both desired and undesired, are fully specified for dual-  
16 mode mobile stations to control the RF interference that one mobile station can cause  
17 another. Base stations are fixed in location and their interference is controlled by proper  
18 layout and operation of the system in which the station operates. Detailed call-processing  
19 procedures are specified for mobile stations to ensure a uniform response to all base  
20 stations. Base station call procedures are not specified in detail because they are a part of  
21 the overall design of the individual land system. However, the base station call-processing  
22 procedures must be compatible with those specified for the mobile station. This approach  
23 to writing the compatibility specification provides the land system designer with sufficient  
24 flexibility to respond to local service needs and to account for local topography and  
25 propagation conditions.

26 The basic radio-system parameters and call-processing procedures for the analog mode of  
27 operation embodied in the compatibility specification were originally derived from the  
28 Chicago and Baltimore-Washington developmental cellular systems and include certain  
29 additions and modifications gained by experience with the operation of commercial  
30 systems.

31 The basic radio-system parameters and call-processing procedures for the wideband spread  
32 spectrum (CDMA) mode of operation embodied in the compatibility specification were  
33 originally derived from the San Diego developmental cellular system. Most functions have  
34 been verified by field trial.

35 This specification includes provisions for future service additions and expansion of system  
36 capabilities. The architecture defined by this specification permits such expansion without  
37 the loss of backwards compatibility to older mobile stations.

**SECTION SUMMARY**

1. **General.** This section defines the terms and numeric indications used in this document. This section also describes the time reference used in the CDMA system and the tolerances used throughout the document.

2. **Requirements for Mobile Station Analog Operation.** This section describes the requirements for CDMA-analog dual-mode mobile stations operating in the analog mode. A mobile station complying with these requirements will be able to operate with analog base stations complying with this document and should be able to operate with analog base stations complying with EIA/TIA-553, EIA/TIA/IS-54, and TIA/EIA/IS-91.

3. **Requirements for Base Station Analog Operation.** This section describes the requirements for analog base stations. A base station complying with these requirements will be able to operate in the analog mode with mobile stations complying with this document and should be able to operate in the analog mode with mobile stations complying with EIA/TIA-553, EIA/TIA/IS-54, and TIA/EIA/IS-91.

4. **Requirements for Mobile Station Analog Options.** This section describes the requirements for CDMA-analog dual-mode mobile stations which use the 32-digit dialing option on the reverse analog control channel. In addition, this section describes mobile station requirements for use of the optional extended protocol.

5. **Requirements for Base Station Analog Options.** This section describes the base station requirements for using the 32-digit dialing option on the reverse analog control channel. In addition, this section describes base station requirements for use of the optional extended protocol.

6. **Requirements for Mobile Station CDMA Operation.** This section describes the requirements for CDMA-analog dual-mode mobile stations operating in the CDMA mode. A mobile station complying with these requirements will be able to operate with CDMA base stations complying with this document.

7. **Requirements for Base Station CDMA Operation.** This section describes the requirements for CDMA base stations. A base station complying with these requirements will be able to operate in the CDMA mode with mobile stations complying with this document.

**Appendix A. Message Encryption and Voice Privacy.** This appendix describes the requirements for message encryption and voice privacy. This appendix is available as a separate document whose distribution is controlled by TIA. The availability of this appendix is governed under the U.S. International Traffic and Arms Regulation (ITAR) and the Export Administration Regulations.

**Appendix B. CDMA Call Flow Examples.** This appendix provides examples of simple call flow in the CDMA system.

**Appendix C. CDMA System Layering.** This appendix describes the layers of the CDMA system: the physical layer (layer 1), the link layer (layer 2), the multiplex sublayer, and the control process layer (layer 3).

**SECTION SUMMARY**

- 1
- 2 **Appendix D. CDMA Constants.** This appendix contains tables that give specific values for  
3 the constant identifiers found in Section 6 and Section 7. These identifiers take the forms  
4  $T_{20m}$  and  $N_{5m}$ . The subscripted numbers vary to identify the particular constant.
- 5 **Appendix E. CDMA Retrievable and Settable Parameters.** This appendix describes the  
6 mobile station parameters that the base station can set and retrieve.
- 7 **Appendix F. Mobile Station Database.** This appendix describes a database model that  
8 can be used for dual-mode mobile stations complying with this document.
- 9 **Appendix G. Bibliography.** This is an informative appendix (not considered part of this  
10 standard) listing documents which may be useful in implementing the standard.

## NOTES

1. Compatibility, as used in connection with this standard, is understood to mean:  
Any dual-mode mobile station that is able to place and receive calls in any cellular system. Conversely all systems are able to place and receive calls for any mobile station. In a subscriber's home system, all call placement must be automatic. Call placement preferably should be automatic when a mobile station is in roam status.
2. The term "dual-mode mobile station" indicates a mobile station capable of both analog (FM) and wideband spread spectrum (CDMA) operation. The term "wideband spread spectrum dual-mode mobile station" is used when a confusion might arise between a dual-mode mobile station complying with this document and other standards such as TIA/EIA/IS-91 or EIA/TIA/IS-54.
3. This compatibility specification is based on the specific United States spectrum allocation for cellular systems.
4. Technical details are included for the operation of two systems in a geographic area, System A and System B, each with a separate set of control channels.
5. IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations," and IS-97 "Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations," provide specifications and measurement methods for cellular equipment.
6. Each cellular system is identified by a unique 15-bit digital code, the SID code (see 2.3.8). The Federal Communications Commission assigns SID codes when cellular system construction permits are issued.
7. Each dual-mode mobile station is assigned a unique 32-bit binary serial number (ESN) which cannot be changed by the subscriber without rendering the mobile station inoperative (see 2.3.2).
8. Reserved.
9. Reserved.
10. RF Emissions. Minimum advisory standards of ANSI and the processing guidelines of FCC are contained in ANSI C95.1-1982 Advisory Standards and FCC Rules and Regulations respectively. Members should also take notice of the more stringent exposure criteria for the general public and for radio frequency carriers with low frequency amplitude modulation as given in NCRP Report No. 86.
11. For the optional analog extended protocol feature (see 4.2 and 5.2), the assignment of message type codes (MST words) will be made using procedures described in TSB39. This will ensure that the feature will be implemented in an orderly manner.

## NOTES

12. Reserved.
13. The allocation of SID numbers is under review by EIA/TIA TR45 for potential revision to accommodate international requirements. Utilization of SID numbers must be coordinated.
14. Although the analog mode of operation (Sections 2, 3, 4, and 5) draws upon EIA/TIA/IS-54-B, some modifications have been made.
15. "Base station" refers to the functions performed on the land side, which are typically distributed among a cell, a sector of a cell, and a mobile switching center.
16. Section 6, Section 7, and the appendices use the following verbal forms: "Shall" and "shall not" identify requirements to be followed strictly to conform to the standard and from which no deviation is permitted. "Should" and "should not" indicate that one of several possibilities is recommended as particularly suitable, without mentioning or excluding others; that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is discouraged but not prohibited. "May" and "need not" indicate a course of action permissible within the limits of the standard. "Can" and "cannot" are used for statements of possibility and capability, whether material, physical, or causal.
17. Footnotes appear at various points in this specification to elaborate and further clarify items discussed in the body of the specification.
18. Unless indicated otherwise, this document presents numbers in decimal form. Binary numbers are distinguished in the text by the use of single quotation marks.
19. The following operators define mathematical operations:
  - $\times$  indicates multiplication.
  - $\lfloor x \rfloor$  indicates the largest integer less than or equal to  $x$ :  $\lfloor 1.1 \rfloor = 1$ ,  $\lfloor 1.0 \rfloor = 1$ .
  - $\lceil x \rceil$  indicates the smallest integer greater or equal to  $x$ :  $\lceil 1.1 \rceil = 2$ ,  $\lceil 2.0 \rceil = 2$ .
  - $|x|$  indicates the absolute value of  $x$ :  $|-17| = 17$ ,  $|17| = 17$ .
  - $\oplus$  indicates exclusive OR (modulo-2 addition).
  - $\min(x, y)$  indicates the minimum of  $x$  and  $y$ .
  - $\max(x, y)$  indicates the maximum of  $x$  and  $y$ .
  - $x \bmod y$  indicates the remainder after dividing  $x$  by  $y$ :  $x \bmod y = x - (y \times \lfloor x/y \rfloor)$ .

## NOTES

20. A potential compatibility problem between ANSI/EIA/TIA-553 and IS-95 exists as a result of differences in access channel boundary determination procedures supported in these two standards. Recommended solutions to this potential compatibility problem are as follows:

**Preferred Solution**

Section 2.3.7 (First Paging Channel) specifies the first paging channels (FIRSTCHP<sub>p</sub>) which must be stored in an IS-95 mobile station and used to identify the first paging channel in paging channel scans when the mobile station is operating in its home system. Defaulting this value to the preferred system's (i.e., A or B band) first dedicated control channel (834.990 MHz/879.990 MHz and 835.020 MHz/880.020 MHz respectively) will prevent paging/access channels from being calculated differently when the IS-95 mobile station operates on an EIA-553 based home system. This solution is used today and should continue to be used to ensure full interoperability of EIA-553 and IS-95 mobile stations on both EIA-553 and IS-95 type systems. This solution does, however, require that both home and roaming IS-95 mobile stations use the same paging channel set (i.e., no split home-roam paging channels).

**Non-Preferred Solution**

If a second portion of the existing spectrum is allocated for control channel use (over and above the dedicated control channels) then split home-roam paging can still be achieved for both IS-54B and EIA-553 mobile stations. This second portion of spectrum could be managed as follows:

- Used exclusively by home IS-95 mobile stations, having appropriate NAM programming, for both paging and access functions or,
- Used by home IS-95 mobile stations, having appropriate NAM programming, for both paging and access functions and by home EIA-553 mobile stations, having appropriate NAM programming, for paging functions only. Home EIA-553 mobile stations would continue to use the existing dedicated control channels for access functions.

21. Forward control channel mobile station control messages of greater than five words in length have been shown to yield compatibility problems in some mobile stations. Implementors of systems are advised that the functions performed by these optional messages may be achieved on assigned voice channels without causing compatibility issues. Mobile station manufacturers are advised that the length of forward control channel messages defined in future standards may be different from that defined in this standard.

22. Those wishing to deploy systems compliant with this standard should also take notice of the requirement to be compliant with FCC part 22, and the referenced version of FCC Office of Engineering and Technology Bulletin 53.

## REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. ANSI and TIA maintain registers of currently valid national standards published by them.

## —American National Standards:

1. ANSI T1.607-1990, *Integrated Services Digital Network (ISDN)—Layer 3 Signaling Specification for Circuit Switched Bearer Service for Digital Subscriber Signaling System Number 1 (DSS1)*, July 1990.
2. ANSI X3.4-1986, *Coded Character Set - 7-bit American National Standard Code for Information Interchange*, 1992.

## —Other Standards:

3. *Common Cryptographic Algorithms*. An ITAR controlled document subject to restricted distribution. Contact the Telecommunications Industry Association, Washington, D.C., December 14, 1994.
4. CCITT Recommendation E.163, *Numbering Plan for the International Telephone Service*, 1988. Note: merged with E.164.
5. CCITT Recommendation E.164 (I.331), *Numbering Plan for the ISDN Era*, 1991.
6. CCITT Recommendation E.212, *Identification Plan for Land Mobile Stations*, 1988.
7. CCITT Recommendation F.69, *The International Telex Service—Service and Operational Provisions of Telex Destination Codes and Telex Network Identifications Codes*, 1994.
8. CCITT Recommendation G.162, *Characteristics of Companders for Telephony*.
9. CCITT Recommendation X.121, *International Numbering Plan for Public Data Networks*, 1992.
10. IEEE Standard 661-1979, *Method for Determining Objective Loudness Ratings of Telephone Connections*, 1979.
11. *Interface Specification for Common Cryptographic Algorithms, Rev A*. Contact the Telecommunications Industry Association, Washington, D.C., December 14, 1994.
12. TIA/EIA/IS-97, *Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations*, December 1994.



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13. TIA/EIA/IS-98, *Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations*, December 1994.
14. TIA/EIA/IS-95-A, *Appendix A, Message Encryption and Voice Privacy*. An ITAR controlled document subject to restricted distribution. Contact the Telecommunications Industry Association, Washington, D.C., November 16, 1994.
15. TSB16, *Assignment of Access Overload Classes in the Cellular Telecommunications Services*, March 1985.
16. TSB29-A, *International Implementation of Cellular Radiotelephone Systems Compliant with ANSI/EIA/TIA-553*, September 1992.
17. TSB39-A, *Message Type Assignments for the Extended Protocol Facility of ANSI/EIA/TIA-553, EIA/TIA/IS-54, TIA/EIA/IS-88 and TIA/EIA/IS-95*, October 1994.
18. TSB50, *User Interface for Authentication Key Entry*, March 1993.
19. TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*,

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## 1 GENERAL

### 1.1 Terms and Numeric Information

#### 1.1.1 Terms

**Abbreviated Alert.** An abbreviated alert is used to remind the mobile station user that previously selected alternative routing features are still active.

**AC.** See Authentication Center.

**Access Attempt.** A sequence of one or more access probe sequences on the Access Channel containing the same message. See also Access Probe and Access Probe Sequence.

**Access Channel.** A Reverse CDMA Channel used by mobile stations for communicating to the base station. The Access Channel is used for short signaling message exchanges such as call originations, responses to pages, and registrations. The Access Channel is a slotted random access channel.

**Access Channel Message.** The information part of an access probe consisting of the message body, length field, and CRC.

**Access Channel Message Capsule.** An Access Channel message plus the padding.

**Access Channel Preamble.** The preamble of an access probe consisting of a sequence of all-zero frames that is sent at the 4800 bps rate.

**Access Channel Request Message.** An Access Channel message that is autonomously generated by the mobile station. See also Access Channel Response Message.

**Access Channel Response Message.** A message on the Access Channel generated to reply to a message received from the base station.

**Access Channel Slot.** The assigned time interval for an access probe. An Access Channel slot consists of an integer number of frames. The transmission of an access probe is performed within the boundaries of an Access Channel slot.

**Access Overload Class.** See Overload Class.

**Access Probe.** One Access Channel transmission consisting of a preamble and a message. The transmission is an integer number of frames in length and transmits one Access Channel message. See also Access Probe Sequence and Access Attempt.

**Access Probe Sequence.** A sequence of one or more access probes on the Access Channel. The same Access Channel message is transmitted in every access probe of an access attempt. See also Access Probe and Access Attempt.

**Acknowledgement.** A Layer 2 response by the mobile station or the base station confirming that a signaling message was received correctly.

**Action Time.** The time at which the action implied by a message should take effect.

**Active Set.** The set of pilots associated with the CDMA Channels containing Forward Traffic Channels assigned to a particular mobile station.

- 1 **Aging.** A mechanism through which the mobile station maintains in its Neighbor Set the  
2 pilots that have been recently sent to it from the base station and the pilots whose handoff  
3 drop timers have recently expired.
- 4 **A-key.** A secret, 64-bit pattern stored in the mobile station and HLR/AC. It is used to  
5 generate/update the mobile station's Shared Secret Data.
- 6 **Analog Access Channel.** An analog control channel used by a mobile station to access a  
7 system to obtain service.
- 8 **Analog Color Code.** An analog signal (see Supervisory Audio Tone) transmitted by a base  
9 station on an analog voice channel and used to detect capture of a mobile station by an  
10 interfering base station or the capture of a base station by an interfering mobile station.
- 11 **Analog Control Channel.** An analog channel used for the transmission of digital control  
12 information from a base station to a mobile station or from a mobile station to a base  
13 station.
- 14 **Analog Paging Channel.** A forward analog control channel that is used to page mobile  
15 stations and send orders.
- 16 **Analog Voice Channel.** An analog channel on which a voice conversation occurs and on  
17 which brief digital messages may be sent from a base station to a mobile station or from a  
18 mobile station to a base station.
- 19 **Authentication.** A procedure used by a base station to validate a mobile station's identity.
- 20 **Authentication Center (AC).** An entity that manages the authentication information  
21 related to the mobile station.
- 22 **Authentication Response (AUTHR).** An 18-bit output of the authentication algorithm. It  
23 is used, for example, to validate mobile station registrations, originations and terminations.
- 24 **Autonomous Registration.** A method of registration in which the mobile station registers  
25 without an explicit command from the base station.
- 26 **AWGN.** Additive White Gaussian Noise.
- 27 **Bad Frames.** Frames classified as erasures (frame category 10) or 9600 bps frames,  
28 primary traffic only with bit errors (frame category 9). See also Good Frames.
- 29 **Base Station.** A station in the Domestic Public Cellular Radio Telecommunications  
30 Service, other than a mobile station, used for communicating with mobile stations.  
31 Depending upon the context, the term base station may refer to a cell, a sector within a cell,  
32 an MSC, or other part of the cellular system. See also MSC.
- 33 **Base Station Authentication Response (AUTHBS).** An 18-bit pattern generated by the  
34 authentication algorithm. AUTHBS is used to confirm the validity of base station orders to  
35 update the Shared Secret Data.
- 36 **Base Station Random Variable (RANDBS).** A 32-bit random number generated by the  
37 mobile station for authenticating base station orders to update the Shared Secret Data.
- 38 **BCH Code.** See Bose-Chaudhuri-Hocquenghem Code.

1 **Blank-and-Burst.** The pre-emption of an entire Traffic Channel frame's primary traffic by  
2 signaling traffic or secondary traffic. Blank-and-burst is performed on a frame-by-frame  
3 basis.

4 **Bose-Chaudhuri-Hocquenghem Code (BCH Code).** A large class of error-correcting cyclic  
5 codes. For any positive integers  $m$ ,  $m \geq 3$ , and  $t < 2^{m-1}$ , there is a binary BCH code with a  
6 block length  $n$  equal to  $2^m - 1$  and  $n - k \leq mt$  parity check bits, where  $k$  is the number of  
7 information bits. The BCH code has a minimum distance of at least  $2t + 1$ .

8 **bps.** Bits per second.

9 **Busy-Idle Bits.** The portion of the data stream transmitted by a base station on a forward  
10 analog control channel that is used to indicate the current busy-idle status of the  
11 corresponding reverse analog control channel.

12 **Call Disconnect.** The process that releases the resources handling a particular call. The  
13 disconnect process begins either when the mobile station user indicates the end of the call  
14 by generating an on-hook condition or other call release mechanism, or when the base  
15 station initiates a release.

16 **Call History Parameter (COUNT).** A modulo-64 event counter maintained by the mobile  
17 station and Authentication Center that is used for clone detection.

18 **Candidate Set.** The set of pilots that have been received with sufficient strength by the  
19 mobile station to be successfully demodulated, but have not been placed in the Active Set  
20 by the base station. See also Active Set, Neighbor Set, and Remaining Set.

21 **CDMA.** See Code Division Multiple Access.

22 **CDMA Channel.** The set of channels transmitted between the base station and the mobile  
23 stations within a given CDMA frequency assignment. See also Forward CDMA Channel and  
24 Reverse CDMA Channel.

25 **CDMA Channel Number.** An 11-bit number corresponding to the center of the CDMA  
26 frequency assignment.

27 **CDMA Frequency Assignment.** A 1.23 MHz segment of spectrum centered on one of the  
28 30 kHz channels of the existing analog system.

29 **Code Channel.** A subchannel of a Forward CDMA Channel. A Forward CDMA Channel  
30 contains 64 code channels. Code channel zero is assigned to the Pilot Channel. Code  
31 channels 1 through 7 may be assigned to the either Paging Channels or the Traffic  
32 Channels. Code channel 32 may be assigned to either a Sync Channel or a Traffic  
33 Channel. The remaining code channels may be assigned to Traffic Channels.

34 **Code Division Multiple Access (CDMA).** A technique for spread-spectrum multiple-access  
35 digital communications that creates channels through the use of unique code sequences.

36 **Code Symbol.** The output of an error-correcting encoder. Information bits are input to the  
37 encoder and code symbols are output from the encoder. See Convolutional Code.

38 **Continuous Transmission.** A mode of operation in which Discontinuous Transmission is  
39 not permitted.

- 1 **Control Mobile Attenuation Code (CMAC).** A 3-bit field in the Control-Filler Message that  
2 specifies the maximum authorized power level for a mobile transmitting on an analog  
3 reverse control channel.
- 4 **Convolutional Code.** A type of error-correcting code. A code symbol can be considered as  
5 the convolution of the input data sequence with the impulse response of a generator  
6 function.
- 7 **CRC.** See Cyclic Redundancy Code.
- 8 **Cyclic Redundancy Code (CRC).** A class of linear error detecting codes which generate  
9 parity check bits by finding the remainder of a polynomial division.
- 10 **Data Burst Randomizer.** The function that determines which power control groups within  
11 a frame are transmitted on the Reverse Traffic Channel when the data rate is lower than  
12 9600 bps. The data burst randomizer determines, for each mobile station, the  
13 pseudorandom position of the transmitted power control groups in the frame while  
14 guaranteeing that every modulation symbol is transmitted exactly once.
- 15 **dBc.** The ratio (in dB) of the sideband power of a signal, measured in a given bandwidth at  
16 a given frequency offset from the center frequency of the same signal, to the total inband  
17 power of the signal. For CDMA, the total inband power of the signal is measured in a 1.23  
18 MHz bandwidth around the center frequency of the CDMA signal.
- 19 **dBm.** A measure of power expressed in terms of its ratio (in dB) to one milliwatt.
- 20 **dBm/Hz.** A measure of power spectral density. dBm/Hz is the power in one Hertz of  
21 bandwidth, where power is expressed in units of dBm.
- 22 **dBW.** A measure of power expressed in terms of its ratio (in dB) to one Watt.
- 23 **Dedicated Control Channel.** An analog control channel used for the transmission of  
24 digital control information from either a base station or a mobile station.
- 25 **Deinterleaving.** The process of unpermuting the symbols that were permuted by the  
26 interleaver. Deinterleaving is performed on received symbols prior to decoding.
- 27 **Digital Color Code (DCC).** A digital signal transmitted by a base station on a forward  
28 analog control channel that is used to detect capture of a base station by an interfering  
29 mobile station.
- 30 **Dim-and-Burst.** A frame in which primary traffic is multiplexed with either secondary  
31 traffic or signaling traffic.
- 32 **Discontinuous Transmission (DTX).** A mode of operation in which a mobile station  
33 transmitter autonomously switches between two transmitter power levels while the mobile  
34 station is in the conversation state on an analog voice channel.
- 35 **Distance-Based Registration.** An autonomous registration method in which the mobile  
36 station registers whenever it enters a cell whose distance from the cell in which the mobile  
37 station last registered exceeds a given threshold.
- 38 **DTMF.** See Dual-Tone Multifrequency.

- 1 **Dual-Tone Multifrequency (DTMF).** Signaling by the simultaneous transmission of two  
2 tones, one from a group of low frequencies and another from a group of high frequencies.  
3 Each group of frequencies consists of four frequencies.
- 4  **$E_b$ .** The energy of an information bit.
- 5  **$E_c/I_0$ .** The ratio in (dB) between the pilot energy accumulated over one PN chip period ( $E_c$ )  
6 to the total power spectral density in the received bandwidth ( $I_0$ ).
- 7 **Effective Radiated Power (ERP).** The transmitted power multiplied by the antenna gain  
8 referenced to a half-wave dipole.
- 9 **Electronic Serial Number (ESN).** A 32-bit number assigned by the mobile station  
10 manufacturer, uniquely identifying the mobile station equipment.
- 11 **Encoder Tail Bits.** A fixed sequence of bits added to the end of a block of data to reset the  
12 convolutional encoder to a known state.
- 13 **ERP.** See Effective Radiated Power.
- 14 **ESN.** See Electronic Serial Number.
- 15 **Extended Protocol.** An optional expansion of the signaling messages between the base  
16 station and mobile station to allow for the addition of new system features and operational  
17 capabilities.
- 18 **Fade Timer.** A timer kept by the mobile station as a measure of Forward Traffic Channel  
19 continuity. If the fade timer expires, the mobile station drops the call.
- 20 **Flash.** An indication sent on an analog voice channel or CDMA Traffic Channel indicating  
21 that the user directed the mobile station to invoke special processing.
- 22 **Foreign NID Roamer.** A mobile station operating in the same system (SID) but a different  
23 network (NID) from the one in which service was subscribed. See also Foreign SID Roamer  
24 and Roamer.
- 25 **Foreign SID Roamer.** A mobile station operating in a system (SID) other than the one from  
26 which service was subscribed. See also Foreign NID Roamer and Roamer.
- 27 **Forward Analog Control Channel (FOCC).** An analog control channel used from a base  
28 station to a mobile station.
- 29 **Forward Analog Voice Channel (FVC).** An analog voice channel used from a base station  
30 to a mobile station.
- 31 **Forward CDMA Channel.** A CDMA Channel from a base station to mobile stations. The  
32 Forward CDMA Channel contains one or more code channels that are transmitted on a  
33 CDMA frequency assignment using a particular pilot PN offset. The code channels are  
34 associated with the Pilot Channel, Sync Channel, Paging Channels, and Traffic Channels.  
35 The Forward CDMA Channel always carries a Pilot Channel and may carry up to one Sync  
36 Channel, up to seven Paging Channels, and up to 63 Traffic Channels, as long as the total  
37 number of channels, including the Pilot Channel, is no greater than 64.
- 38 **Forward Traffic Channel.** A code channel used to transport user and signaling traffic from  
39 the base station to the mobile station.



- 1 **Frame.** A basic timing interval in the system. For the Access Channel, Paging Channel,  
2 and Traffic Channel, a frame is 20 ms long. For the Sync Channel, a frame is 26.666... ms  
3 long.
- 4 **Frame Category.** A classification of a received Traffic Channel frame based upon  
5 transmission data rate, the frame contents (primary traffic, secondary traffic, or signaling  
6 traffic), and whether there are detected errors in the frame.
- 7 **Frame Offset.** A time skewing of Traffic Channel frames from System Time in integer  
8 multiples of 1.25 ms. The maximum frame offset is 18.75 ms.
- 9 **Frame Quality Indicator.** The CRC check applied to 9600 bps and 4800 bps Traffic  
10 Channel frames.
- 11 **Global Positioning System (GPS).** A US government satellite system that provides location  
12 and time information to users. See Navstar GPS Space Segment / Navigation User  
13 Interfaces ICD-GPS-200 for specifications.
- 14 **Good Frames.** Frames not classified as bad frames. See also Bad Frames.
- 15 **GPS.** See Global Positioning System.
- 16 **Half Frame.** A 10 ms interval on the Paging Channel. Two half frames comprise a frame.  
17 The first half frame begins at the same time as the frame.
- 18 **Handoff.** The act of transferring communication with a mobile station from one base  
19 station to another.
- 20 **Hard Handoff.** A handoff characterized by a temporary disconnection of the Traffic  
21 Channel. Hard handoffs occur when the mobile station is transferred between disjoint  
22 Active Sets, the CDMA frequency assignment changes, the frame offset changes, or the  
23 mobile station is directed from a CDMA Traffic Channel to an analog voice channel. See  
24 also Soft Handoff.
- 25 **Hash Function.** A function used by the mobile station to select one out of N available  
26 resources. The hash function distributes the available resources uniformly among a  
27 random sample of mobile stations.
- 28 **HLR.** See Home Location Register.
- 29 **Home Location Register (HLR).** The location register to which a MIN/IMSI is assigned for  
30 record purposes such as subscriber information.
- 31 **Home System.** The cellular system in which the mobile station subscribes for service.
- 32 **Idle Handoff.** The act of transferring reception of the Paging Channel from one base  
33 station to another, when the mobile station is in the *Mobile Station Idle State*.
- 34 **Implicit Registration.** A registration achieved by a successful transmission of an  
35 origination or page response on the Access Channel.
- 36 **IMSI.** See International Mobile Station Identity.
- 37 **Interleaving.** The process of permuting a sequence of symbols.

- 1 **International Mobile Station Identity (IMSI).** A method of identifying stations in the land  
2 mobile service as specified in CCITT Recommendation E.212.
- 3 **kHz.** Kilo-hertz ( $10^3$  Hertz).
- 4 **ksp/s.** Kilo-symbols per second ( $10^3$  symbols per second).
- 5 **Layering.** A method of organization for communication protocols. A layer is defined in  
6 terms of its communication protocol to a peer layer in another entity and the services it  
7 offers to the next higher layer in its own entity.
- 8 **Layer 1.** See Physical Layer.
- 9 **Layer 2.** Layer 2 provides for the correct transmission and reception of signaling  
10 messages, including partial duplicate detection. See also Layering and Layer 3.
- 11 **Layer 3.** Layer 3 provides the control of the cellular telephone system. Signaling messages  
12 originate and terminate at layer 3. See also Layering and Layer 2.
- 13 **Local Control.** An optional mobile station feature used to perform manufacturer-specific  
14 functions.
- 15 **Long Code.** A PN sequence with period  $2^{42} - 1$  that is used for scrambling on the Forward  
16 CDMA Channel and spreading on the Reverse CDMA Channel. The long code uniquely  
17 identifies a mobile station on both the Reverse Traffic Channel and the Forward Traffic  
18 Channel. The long code provides limited privacy. The long code also separates multiple  
19 Access Channels on the same CDMA channel. See also Public Long Code and Private Long  
20 Code.
- 21 **Long Code Mask.** A 42-bit binary number that creates the unique identity of the long  
22 code. See also Public Long Code, Private Long Code, Public Long Code Mask, and Private  
23 Long Code Mask.
- 24 **LSB.** Least significant bit.
- 25 **Maximal Length Sequence (m-Sequence).** A binary sequence of period  $2^n - 1$ ,  $n$  a positive  
26 integer, with no internal periodicities. A maximal length sequence can be generated by a  
27 tapped  $n$ -bit shift register with linear feedback.
- 28 **MCC.** See Mobile Country Code.
- 29 **Mcps.** Megachips per second ( $10^6$  chips per second).
- 30 **Mean Input Power.** The total received calorimetric power measured in a specified  
31 bandwidth at the antenna connector, including all internal and external signal and noise  
32 sources.
- 33 **Mean Output Power.** The total transmitted calorimetric power measured in a specified  
34 bandwidth at the antenna connector when the transmitter is active.
- 35 **Message.** A data structure that conveys control information or application information. A  
36 message consists of a length field (MSG\_LENGTH), a message body (the part conveying the  
37 information), and a CRC.
- 38 **Message Body.** The part of the message contained between the length field (MSG\_LENGTH)  
39 and the CRC field.

- 1 **Message Capsule.** A sequence of bits comprising a single message and padding. The  
2 padding always follows the message and may be of zero length.
- 3 **Message CRC.** The CRC check associated with a message.
- 4 **Message Field.** A basic named element in a message. A message field may consist of zero  
5 or more bits.
- 6 **Message Record.** An entry in a message consisting of one or more fields that repeats in the  
7 message.
- 8 **MHz.** Megahertz ( $10^6$  Hertz).
- 9 **MIN.** See Mobile Identification Number.
- 10 **MNC.** See Mobile Network Code.
- 11 **Mobile Country Code (MCC).** A part of the E.212 IMSI identifying the home country. See  
12 CCITT Recommendation E.212.
- 13 **Mobile Network Code (MNC).** A part of the E.212 IMSI identifying the home network  
14 within the home country. See CCITT Recommendation E.212.
- 15 **Mobile Protocol Capability Indicator (MPCI).** A 2-bit field used to indicate the mobile  
16 station's capabilities.
- 17 **Mobile Station.** A station in the Domestic Public Cellular Radio Telecommunications  
18 Service intended to be used while in motion or during halts at unspecified points. Mobile  
19 stations include portable units (e.g., hand-held personal units) and units installed in  
20 vehicles.
- 21 **Mobile Station Class.** Mobile station classes define mobile station characteristics such as  
22 slotted operation and transmission power. See Table 2.3.3-1.
- 23 **Mobile Identification Number (MIN).** The 34-bit number that is a digital representation of  
24 the 10-digit number assigned to a mobile station.
- 25 **Mobile Station Identification Number (MSIN).** A part of the E.212 IMSI identifying the  
26 mobile station within its home network. See CCITT Recommendation E.212.
- 27 **Mobile Station Originated Call.** A call originating from a mobile station.
- 28 **Mobile Station Terminated Call.** A call received by a mobile station (not to be confused  
29 with a disconnect or call release).
- 30 **Mobile Switching Center (MSC).** A configuration of equipment that provides cellular  
31 radiotelephone service. Also called the Mobile Telephone Switching Office (MTSO).
- 32 **Modulation Symbol.** The output of the data modulator before spreading. On the Reverse  
33 Traffic Channel, 64-ary orthogonal modulation is used and six code symbols are associated  
34 with one modulation symbol. On the Forward Traffic Channel, each code symbol (when the  
35 data rate is 9600 bps) or each repeated code symbol (when the data rate is less than 9600  
36 bps) is one modulation symbol.
- 37 **ms.** Millisecond.
- 38 **MSB.** Most significant bit.

- 1 **MSC.** See Mobile Switching Center.
- 2 **MSIN.** See Mobile Station Identification Number.
- 3 **Multiplex Option.** The ability of the multiplex sublayer and lower layers to be tailored to  
4 provide special capabilities. A multiplex option defines such characteristics as the frame  
5 format and the rate decision rules. See also Multiplex Sublayer.
- 6 **Multiplex Sublayer.** One of the conceptual layers of the system that multiplexes and  
7 demultiplexes primary traffic, secondary traffic, and signaling traffic.
- 8 **NAM.** See Number Assignment Module.
- 9 **Narrow Analog.** A type of voice channel that uses 10 kHz channel spacing and uses  
10 subaudible signaling.
- 11 **National Mobile Station Identity (NMSI).** A part of the E.212 IMSI identifying the mobile  
12 station within its home country. The NMSI consists of the NMC and the MSIN. See CCITT  
13 Recommendation E.212.
- 14 **Neighbor Set.** The set of pilots associated with the CDMA Channels that are probable  
15 candidates for handoff. Normally, the Neighbor Set consists of the pilots associated with  
16 CDMA Channels that cover geographical areas near the mobile station. See also Active Set,  
17 Candidate Set, and Remaining Set.
- 18 **Network.** A network is a subset of a cellular system, such as an area-wide cellular  
19 network, a private group of base stations, or a group of base stations set up to handle a  
20 special requirement. A network can be as small or as large as needed, as long as it is fully  
21 contained within a system. See also System.
- 22 **Network Identification (NID).** A number that uniquely identifies a network within a  
23 cellular system. See also System Identification.
- 24 **NID.** See Network Identification.
- 25 **NMSI.** See National Mobile Station Identity.
- 26 **Non-Autonomous Registration.** A registration method in which the base station initiates  
27 registration. See also Autonomous Registration.
- 28 **Non-Slotted Mode.** An operation mode of the mobile station in which the mobile station  
29 continuously monitors the Paging Channel.
- 30 **ns.** Nanosecond.
- 31 **NULL.** A value which is not in the specified range of the field.
- 32 **Null Traffic Channel Data.** One or more frames of 16 '1's followed by eight '0's sent at the  
33 1200 bps rate. Null Traffic Channel data is sent when no service option is active and no  
34 signaling message is being sent. Null Traffic Channel data serves to maintain the  
35 connectivity between the mobile station and the base station.
- 36 **Number Assignment Module (NAM).** A set of MIN/IMSI-related parameters stored in the  
37 mobile station.

- 1 **Numeric Information.** Numeric information consists of parameters that appear as  
2 numeric fields in messages exchanged by the base station and the mobile station and  
3 information used to describe the operation of the mobile station.
- 4 **OLC.** See Overload Class (CDMA) or Overload Control (analog).
- 5 **Optional Field.** A field defined within a message structure that is optionally transmitted to  
6 the message recipient.
- 7 **Order.** A type of message that contains control codes for either the mobile station or the  
8 base station.
- 9 **Ordered Registration.** A registration method in which the base station orders the mobile  
10 station to send registration related parameters.
- 11 **Overhead Message.** A message sent by the base station on the Paging Channel to  
12 communicate base-station-specific and system-wide information to mobile stations.
- 13 **Overload Class.** The means used to control system access by mobile stations, typically in  
14 emergency or other overloaded conditions. Mobile stations are assigned one (or more) of  
15 sixteen overload classes. Access to the CDMA system can then be controlled on a per class  
16 basis by persistence values transmitted by the base station.
- 17 **Overload Control (OLC).** A means to restrict reverse analog control channel accesses by  
18 mobile stations. Mobile stations are assigned one (or more) of sixteen control levels. Access  
19 is selectively restricted by a base station setting one or more OLC bits in the Overload  
20 Control Global Action Message.
- 21 **Packet.** The unit of information exchanged between the service option applications of the  
22 base station and the mobile station.
- 23 **Padding.** A sequence of bits used to fill from the end of a message to the end of a message  
24 capsule, typically to the end of the frame or half frame. All bits in the padding are '0'.
- 25 **Paging.** The act of seeking a mobile station when a call has been placed to that mobile  
26 station.
- 27 **Paging Channel (Analog).** See Analog Paging Channel.
- 28 **Paging Channel (CDMA).** A code channel in a Forward CDMA Channel used for  
29 transmission of control information and pages from a base station to a mobile station.
- 30 **Paging Channel Slot.** An 80 ms interval on the Paging Channel. Mobile stations operating  
31 in the slotted mode are assigned specific slots in which they monitor messages from the  
32 base station.
- 33 **Parameter-Change Registration.** A registration method in which the mobile station  
34 registers when certain of its stored parameters change.
- 35 **Parity Check Bits.** Bits added to a sequence of information bits to provide error detection,  
36 correction, or both.
- 37 **Persistence.** A probability measure used by the mobile station to determine if it should  
38 transmit in a given Access Channel Slot.

1 **Physical Layer.** The part of the communication protocol between the mobile station and  
2 the base station that is responsible for the transmission and reception of data. The  
3 physical layer in the transmitting station is presented a frame by the multiplex sublayer  
4 and transforms it into an over-the-air waveform. The physical layer in the receiving station  
5 transforms the waveform back into a frame and presents it to the multiplex sublayer above  
6 it.

7 **Pilot Channel.** An unmodulated, direct-sequence spread spectrum signal transmitted  
8 continuously by each CDMA base station. The Pilot Channel allows a mobile station to  
9 acquire the timing of the Forward CDMA Channel, provides a phase reference for coherent  
10 demodulation, and provides a means for signal strength comparisons between base stations  
11 for determining when to handoff.

12 **Pilot PN Sequence.** A pair of modified maximal length PN sequences with period  $2^{15}$  used  
13 to spread the Forward CDMA Channel and the Reverse CDMA Channel. Different base  
14 stations are identified by different pilot PN sequence offsets.

15 **Pilot PN Sequence Offset Index.** The PN offset in units of 64 PN chips of a pilot, relative  
16 to the zero offset pilot PN sequence.

17 **Pilot Strength.** The ratio of received pilot energy to overall received energy. See also  
18  $E_c/I_0$ .

19 **PN Chip.** One bit in the PN sequence.

20 **PN Sequence.** Pseudonoise sequence. A periodic binary sequence.

21 **Power Control Bit.** A bit sent in every 1.25 ms interval on the Forward Traffic Channel to  
22 signal the mobile station to increase or decrease its transmit power.

23 **Power Control Group.** A 1.25 ms interval on the Forward Traffic Channel and the Reverse  
24 Traffic Channel. See also Power Control Bit.

25 **Power-Down Registration.** An autonomous registration method in which the mobile  
26 station registers on power-down.

27 **Power-Up Registration.** An autonomous registration method in which the mobile station  
28 registers on power-up.

29 **PPM.** Parts per million.

30 **Preamble.** See Access Channel Preamble and Traffic Channel Preamble.

31 **Primary CDMA Channel.** A CDMA Channel at a preassigned frequency assignment used  
32 by the mobile station for initial acquisition. See also Secondary CDMA Channel.

33 **Primary Paging Channel (CDMA).** The default code channel (code channel 1) assigned for  
34 paging on a CDMA Channel.

35 **Primary Traffic.** The main traffic stream carried between the mobile station and the base  
36 station, supporting the active primary service option, on the Traffic Channel. See also  
37 Secondary Traffic, Signaling Traffic, and Service Option.

38 **Private Long Code.** The long code characterized by the private long code mask. See also  
39 Long Code.

- 1 **Private Long Code Mask.** The long code mask used to form the private long code. See  
2 also Public Long Code Mask and Long Code.
- 3 **Public Long Code.** The long code characterized by the public long code mask.
- 4 **Public Long Code Mask.** The long code mask used to form the public long code. The  
5 mask contains the ESN of the mobile station. See also Private Long Code Mask and Long  
6 Code.
- 7 **Punctured Code.** An error-correcting code generated from another error-correcting code by  
8 deleting (i.e., puncturing) code symbols from the coder output.
- 9 **Quick Repeats.** Additional transmissions of identical copies of a message within a short  
10 interval to increase the probability that the message is received correctly.
- 11 **Receive Objective Loudness Rating (ROLR).** A perceptually weighted transducer gain of  
12 telephone receivers relating electrical excitation from a reference generator to sound  
13 pressure at the earphone. The receive objective loudness rating is normally specified in dB  
14 relative to one Pascal per millivolt. See IEEE Standard 269-1992, IEEE Standard 661-  
15 1979, CCITT Recommendation P.76, and CCITT Recommendation P.79.
- 16 **Registration.** The process by which a mobile station identifies its location and parameters  
17 to a base station.
- 18 **Registration Zone.** A collection of one or more base stations treated as a unit when  
19 determining whether a mobile station should perform zone-based registration.
- 20 **Release.** A process that the mobile station and base station use to inform each other of  
21 call disconnect.
- 22 **Remaining Set.** The set of all allowable pilot offsets as determined by PILOT\_INC,  
23 excluding the pilot offsets of the pilots in the Active Set, Candidate Set, and Neighbor Set.  
24 See also Active Set, Candidate Set, and Neighbor Set.
- 25 **Request.** A layer 3 message generated by either the mobile station or the base station to  
26 retrieve information, ask for service, or command an action.
- 27 **Response.** A layer 3 message generated as a result of another message, typically a request.
- 28 **Reverse Analog Control Channel (RECC).** The analog control channel used from a mobile  
29 station to a base station.
- 30 **Reverse Analog Voice Channel (RVC).** The analog voice channel used from a mobile  
31 station to a base station.
- 32 **Reverse CDMA Channel.** The CDMA Channel from the mobile station to the base station.  
33 From the base station's perspective, the Reverse CDMA Channel is the sum of all mobile  
34 station transmissions on a CDMA frequency assignment.
- 35 **Reverse Traffic Channel.** A Reverse CDMA Channel used to transport user and signaling  
36 traffic from a single mobile station to one or more base stations.
- 37 **Roamer.** A mobile station operating in a cellular system (or network) other than the one  
38 from which service was subscribed. See also Foreign NID Roamer and Foreign SID Roamer.
- 39 **ROLR.** See Receive Objective Loudness Rating.

- 1 **SAT.** See Supervisory Audio Tone.
- 2 **Scan of Channels.** The procedure by which a mobile station examines the signal strength  
3 of each forward analog control channel.
- 4 **SCL.** See Synchronized Capsule Indicator bit.
- 5 **Search Window.** The range of PN sequence offsets that a mobile station searches for a  
6 pilot.
- 7 **Secondary CDMA Channel.** A CDMA Channel at a preassigned frequency assignment  
8 used by the mobile station for initial acquisition. See also Primary CDMA Channel.
- 9 **Secondary Traffic.** An additional traffic stream that can be carried between the mobile  
10 station and the base station on the Traffic Channel. See also Primary Traffic and Signaling  
11 Traffic.
- 12 **Seizure Precursor.** The initial digital sequence transmitted by a mobile station to a base  
13 station on a reverse analog control channel.
- 14 **Service Option.** A service capability of the system. Service options may be applications  
15 such as voice, data, or facsimile. See TSB58, "Administration of Parameter Value  
16 Assignments for TIA/EIA Wideband Spread Spectrum Standards."
- 17 **Shared Secret Data (SSD).** A 128-bit pattern stored in the mobile station (in semi-  
18 permanent memory) and known by the base station. SSD is a concatenation of two 64-bit  
19 subsets: SSD\_A, which is used to support the authentication procedures, and SSD\_B,  
20 which serves as one of the inputs to the process generating the encryption mask and  
21 private long code.
- 22 **Short Message Services (SMS).** A suite of services such as SMS Text Delivery, Digital  
23 Paging (i.e., Call Back Number - CBN), and Voice Mail Notification (VMN).
- 24 **SID.** See System Identification.
- 25 **Signaling Tone.** A 10 kHz tone transmitted by a mobile station on an analog voice channel  
26 to: 1) confirm orders, 2) signal flash requests, and 3) signal release requests.
- 27 **Signaling Traffic.** Control messages that are carried between the mobile station and the  
28 base station on the Traffic Channel. See also Primary Traffic and Secondary Traffic.
- 29 **Slot Cycle.** A periodic interval at which a mobile station operating in the slotted mode  
30 monitors the Paging Channel.
- 31 **Slotted Mode.** An operation mode of the mobile station in which the mobile station  
32 monitors only selected slots on the Paging Channel when in the *Mobile Station Idle State*.
- 33 **Soft Handoff.** A handoff occurring while the mobile station is in the *Mobile Station Control*  
34 *on the Traffic Channel State*. This handoff is characterized by commencing communications  
35 with a new base station on the same CDMA frequency assignment before terminating  
36 communications with the old base station. See also Hard Handoff.
- 37 **SOM.** Start-of-Message bit.
- 38 **SSD.** See Shared Secret Data.



- 1 **sps.** Symbols per second.
- 2 **Station Class Mark (SCM).** An identification of certain characteristics of a mobile station.  
3 Classes are defined in Table 2.3.3-1.
- 4 **Status Information.** The following status information is used to describe mobile station  
5 operation when using the analog system:
- 6 • **Serving-System Status.** Indicates whether a mobile station is tuned to channels  
7 associated with System A or System B.
  - 8 • **First Registration ID Status.** A status variable used by the mobile station in  
9 association with its processing of received Registration ID messages.
  - 10 • **First Location Area ID Status.** A status variable used by the mobile station in  
11 association with its processing of received Location Area ID messages.
  - 12 • **Location Registration ID Status.** A status variable used by the mobile station in  
13 association with its processing of power-up registrations and location-based  
14 registrations.
  - 15 • **First Idle ID Status.** A status variable used by the mobile station in association with  
16 its processing of the Idle Task.
  - 17 • **Local Control Status.** Indicates whether a mobile station must respond to local  
18 control messages.
  - 19 • **Roam Status.** Indicates whether a mobile station is in its home system.
  - 20 • **Termination Status.** Indicates whether a mobile station must terminate the call  
21 when it is on an analog voice channel.
- 22 **Supervisory Audio Tone (SAT).** One of three tones in the 6 kHz region that is transmitted  
23 on the forward analog voice channel by a base station and transponded on the reverse  
24 analog voice channel by a mobile station.
- 25 **Supplementary Digital Color Code (SDCC1, SDCC2).** Additional bits assigned to increase  
26 the number of color codes from four to sixty four, transmitted on the forward analog control  
27 channel.
- 28 **Symbol.** See Code Symbol and Modulation Symbol.
- 29 **Sync Channel.** Code channel 32 in the Forward CDMA Channel which transports the  
30 synchronization message to the mobile station.
- 31 **Sync Channel Superframe.** An 80 ms interval consisting of three Sync Channel frames  
32 (each 26.666... ms in length).
- 33 **Synchronized Capsule Indicator Bit (SCI).** The first bit in any Paging Channel half frame  
34 which indicates whether a synchronized message capsule immediately follows.
- 35 **System.** A system is a cellular telephone service that covers a geographic area such as a  
36 city, metropolitan region, county, or group of counties. See also Network.
- 37 **System Identification (SID).** A number uniquely identifying a cellular system.

- 1 **System Time.** The time reference used by the system. System Time is synchronous to  
2 UTC time (except for leap seconds) and uses the same time origin as GPS time. All base  
3 stations use the same System Time (within a small error). Mobile stations use the same  
4 System Time, offset by the propagation delay from the base station to the mobile station.  
5 See also Universal Coordinated Time.
- 6 **Timer-Based Registration.** A registration method in which the mobile station registers  
7 whenever a counter reaches a predetermined value. The counter is incremented an average  
8 of once per 80 ms period.
- 9 **Time Reference.** A reference established by the mobile station that is synchronous with  
10 the earliest arriving multipath component used for demodulation.
- 11 **TOLR.** See Transmit Objective Loudness Rating.
- 12 **Traffic Channel.** A communication path between a mobile station and a base station used  
13 for user and signaling traffic. The term Traffic Channel implies a Forward Traffic Channel  
14 and Reverse Traffic Channel pair. See also Forward Traffic Channel and Reverse Traffic  
15 Channel.
- 16 **Traffic Channel Preamble.** A sequence of all-zero frames that is sent at the 9600 bps rate  
17 by the mobile station on the Reverse Traffic Channel. The Traffic Channel preamble is sent  
18 during initialization of the Traffic Channel.
- 19 **Transmit Objective Loudness Rating (TOLR).** A perceptually weighted transducer gain of  
20 telephone transmitters relating sound pressure at the microphone to voltage at a reference  
21 electrical termination. It is normally specified in dB relative to one millivolt per Pascal. See  
22 IEEE Standard 269-1992, IEEE Standard 661-1979, CCITT Recommendation P.76, and  
23 CCITT Recommendation P.79.
- 24 **Unique Challenge-Response Procedure.** An exchange of information between a mobile  
25 station and a base station for the purpose of confirming the mobile station's identity. The  
26 procedure is initiated by the base station and is characterized by the use of a challenge-  
27 specific random number (i.e., RANDU) instead of the random variable broadcast globally  
28 (RAND).
- 29 **Unique Random Variable (RANDU).** A 24-bit random number generated by the base  
30 station in support of the Unique Challenge-Response procedure.
- 31 **Universal Coordinated Time (UTC).** An internationally agreed-upon time scale  
32 maintained by the Bureau International de l'Heure (BIH) used as the time reference by  
33 nearly all commonly available time and frequency distribution systems i.e., WWV, WWVH,  
34 LORAN-C, Transit, Omega, and GPS.
- 35 **UTC.** Universal Temps Coordonné. See Universal Coordinated Time.
- 36 **Voice Channel.** See Analog Voice Channel.
- 37 **Voice Mobile Attenuation Code (VMAC).** Indicates the mobile station power level  
38 associated with the designated analog voice channel.
- 39 **Voice Privacy.** The process by which user voice transmitted over a CDMA Traffic Channel  
40 is afforded a modest degree of protection against eavesdropping over the air.

**Walsh Chip.** The shortest identifiable component of a Walsh function. There are  $2^N$  Walsh chips in one Walsh function where  $N$  is the order of the Walsh function. On the Forward CDMA Channel, one Walsh chip equals  $1/1.2288$  MHz, or 813.802... ns. On the Reverse CDMA Channel, one Walsh chip equals  $4/1.2288$  MHz, or 3.255...  $\mu$ s.

**Walsh Function.** One of  $2^N$  time orthogonal binary functions (note that the functions are orthogonal after mapping '0' to 1 and '1' to -1).

**Zone-Based Registration.** An autonomous registration method in which the mobile station registers whenever it enters a zone that is not in the mobile station's zone list.

$\mu$ s. Microsecond.

#### 1.1.2 Numeric Information

Numeric information is used to describe the operation of the mobile station. The following subscripts are used to clarify the use of the numeric information:

- "s" indicates a value stored in a mobile station's temporary memory.
- "sv" indicates a stored value that varies as a mobile station processes various tasks.
- "sl" indicates the stored limits on values that vary.
- "r" indicates a value received by a mobile station over a forward analog control channel or a CDMA Forward Channel.
- "p" indicates a value set in a mobile station's permanent security and identification memory.
- "s-p" indicates a value stored in a mobile station's semi-permanent security and identification memory.

##### 1.1.2.1 Analog Numeric Information

**ACCOLC<sub>p</sub>** - A four-bit number used to identify which overload class field controls access attempts.

**BIS<sub>s</sub>** - Identifies whether a mobile station must check for an idle-to-busy transition on a reverse analog control channel when accessing a system.

**CCLIST<sub>s</sub>** - The list of analog control channels to be scanned by a mobile station processing the Directed Retry Task (see 2.6.3.14).

**CMA<sub>s</sub>** - The maximum number of channels to be scanned by a mobile station when accessing a system.

**COUNT<sub>s-p</sub>** - A modulo-64 count held in the mobile station. COUNT<sub>s-p</sub> is maintained during power-off.

**CPA<sub>s</sub>** - Identifies whether the access functions are combined with the paging functions on the same set of analog control channels.

**DCC<sub>s</sub>** - A DCC value stored in a mobile station's temporary memory.

**DTX<sub>s</sub>** - Identifies in what way the mobile station is permitted to use the discontinuous transmission mode on the analog voice channel.

- 1  **$E_s$**  - The stored value of the E field sent on the forward analog control channel.  $E_s$   
2 identifies whether a home mobile station must send only  $MIN1_p$  or both  $MIN1_p$  and  $MIN2_p$   
3 when accessing the system.
- 4  **$EX_p$**  - Identifies whether home mobile stations must send  $MIN1_p$  or both  $MIN1_p$  and  $MIN2_p$   
5 when accessing the system.  $EX_p$  differs from  $E_s$  in that the information is stored in the  
6 mobile station's security and identification memory.
- 7  **$FIRSTCHA_s$**  - The number of the first analog control channel used for accessing a system.
- 8  **$FIRSTCHD_s$**  - The number for the first channel used as a dedicated control channel.
- 9  **$FIRSTCHP_p$**  - The number of the first paging channel used as a paging channel in the  
10 mobile station's "home" system.
- 11  **$FIRSTCHP_s$**  - The number of the first analog control channel used for paging mobile  
12 stations.
- 13  **$HOME\_SID_p$**  - Home System Identification. A 15-bit value that identifies the home system  
14 for a MIN supported by the mobile station.
- 15  **$LASTCHA_s$**  - The number of the last analog control channel used for accessing a system.
- 16  **$LASTCHD_s$**  - The number for the last channel used as a dedicated control channel.
- 17  **$LASTCHP_s$**  - The number of the last analog control channel used for paging mobile  
18 stations.
- 19  **$LOCAD_s$**  - The received location area identity.
- 20  **$LOCAD_{s-p}$**  - Identifies the current location area.
- 21  **$LRCC_s$**  - The last registration control channel used by a mobile station.
- 22  **$LREG_s$**  - The stored value of the LREG field received in the most recent Location Area  
23 Global Action Message.
- 24  **$LT_s$**  - Identifies whether the next access attempt is required to be the last try.
- 25  **$MAXBUSY_{cl}$**  - The maximum number of busy occurrences allowed on a reverse analog  
26 control channel.
- 27  **$MAXSZTR_{cl}$**  - The maximum number of seizure attempts allowed on a reverse analog  
28 control channel.
- 29  **$MIN1_p$**  - The 24 least significant bits of the 34-bit MIN.
- 30  **$MIN2_p$**  - The ten most significant bits of the 34-bit MIN.
- 31  **$N_s$**  - The number of analog paging channels that a mobile station must scan.
- 32  **$NBUSY_{sv}$**  - The number of times a mobile station attempts to seize a reverse analog control  
33 channel and finds the reverse control channel busy.
- 34  **$NSZTR_{sv}$**  - The number of times a mobile station attempts to seize a reverse analog control  
35 channel and fails.
- 36  **$NXTREG_{s-p}$**  - Identifies when a mobile station must make its next registration to a system.

- 1 **PDREG<sub>s</sub>** – The stored value of the PDREG field received in the most recent Location Area
- 2 Global Action Message.
- 3 **PL<sub>s</sub>** – The mobile station RF power level.
- 4 **PUREG<sub>s</sub>** – The stored value of the PUREG field received in the most recent Location Area
- 5 Global Action Message.
- 6 **PUREG<sub>s-p</sub>** – The semi-permanent value of PUREG<sub>s</sub>.
- 7 **R<sub>s</sub>** – Indicates whether registration is enabled or not.
- 8 **RAND<sub>s</sub>** – The stored value of RAND. See 2.3.12.1.2.
- 9 **RCF<sub>s</sub>** – Identifies whether the mobile station must read a Control Filler Message before
- 10 accessing a system on a reverse analog control channel.
- 11 **REGID<sub>s</sub>** – The stored value of the last registration number (REGID<sub>r</sub>) received on a forward
- 12 analog control channel.
- 13 **REGINCR<sub>s</sub>** – Identifies increments between registrations by a mobile station.
- 14 **S<sub>s</sub>** – Identifies whether the mobile station must send its serial number when accessing a
- 15 system.
- 16 **SCC<sub>s</sub>** – A digital number that is stored and used to identify which SAT frequency a mobile
- 17 station should be receiving.
- 18 **SCM<sub>p</sub>** – Station Class Mark. Defines mobile station parameters such as power class. See
- 19 Table 2.3.3-1.
- 20 **SDCC1<sub>s</sub>** – The SDCC value stored in a mobile station's temporary memory.
- 21 **SDCC2<sub>s</sub>** – The SDCC value stored in a mobile station's temporary memory.
- 22 **SID<sub>p</sub>** – The home system identification stored in the mobile station's permanent security
- 23 and identification memory.
- 24 **SID<sub>r</sub>** – The system identification received on a paging or access channel.
- 25 **SID<sub>s</sub>** – The system identification received on a dedicated control channel.
- 26 **SID<sub>s-p</sub>** – Identifies the system of current (last successful) registration.
- 27 **SSD\_A<sub>s-p</sub>** – The 64 most significant bits of the Shared Secret Data. SSD\_A<sub>s-p</sub> is used for
- 28 support of the authentication procedures.
- 29 **SSD\_B<sub>s-p</sub>** – The 64 least significant bits of the Shared Secret Data. SSD\_B<sub>s-p</sub> is used for
- 30 message encryption.
- 31 **WFOG<sub>s</sub>** – Identifies whether a mobile station must wait for an Overhead Message Train
- 32 before accessing a system on a reverse analog control channel.
- 33 **1.1.2.2 CDMA Numeric Information**
- 34 The following are internal values stored by the mobile station in temporary memory which
- 35 are not sent over the air. See Appendix F for values stored by the mobile station in
- 36 permanent and semi-permanent memory.

- 1    **ACC\_CHAN<sub>s</sub>** – Number of Access Channels supported by the current Paging Channel.
- 2    **ACC\_MSG\_SEQ<sub>s</sub>** – Last received *Access Parameters Message* sequence number.
- 3    **ACC\_TMO<sub>s</sub>** – Access Channel acknowledgement timeout, in units of 80 ms.
- 4    **ACK\_WAITING<sub>s</sub>[i]** – Acknowledgement status indicator for message sequence number i.
- 5    Set to YES if an acknowledgement is pending for the message; otherwise, set to NO.
- 6    **AGE<sub>s</sub>** – Neighbor list age. For each pilot in the Neighbor Set, the mobile station increments
- 7    this counter each time a *Neighbor List Message* is received. When AGE<sub>s</sub> exceeds
- 8    NGBHR\_MAX\_AGE, the pilot is deleted from the Neighbor Set.
- 9    **ANALOG\_CHAN<sub>s</sub>** – Analog channel number for CDMA-to-analog handoff.
- 10   **AN\_CHAN\_TYPE<sub>s</sub>** – Analog voice channel type.
- 11   **AUTH<sub>s</sub>** – Current authentication mode.
- 12   **BAD\_FRAMES<sub>s</sub>** – Bad frames count. The number of received bad frames.
- 13   **BAND\_CLASS<sub>s</sub>** – Frequency band of operation.
- 14   **BASE\_CLASS<sub>s</sub>** – Base station class of the current base station.
- 15   **BASE\_ID<sub>s</sub>** – Base station identification of the current base station.
- 16   **BASE\_LAT<sub>s</sub>** – Latitude of the current base station, in units of 0.25 seconds.
- 17   **BASE\_LONG<sub>s</sub>** – Longitude of the current base station, in units of 0.25 seconds.
- 18   **BKOFF<sub>s</sub>** – Access Channel probe sequence backoff range.
- 19   **CDMACH<sub>s</sub>** – CDMA Channel number. The CDMA Channel number currently used by the
- 20   mobile station.
- 21   **CHAN\_LST\_MSG\_SEQ<sub>s</sub>** – *CDMA Channel List Message* sequence number.
- 22   **CODE\_CHAN<sub>s</sub>** – Code channel for channel assignment or CDMA-to-CDMA handoff.
- 23   **CONFIG\_MSG\_SEQ<sub>s</sub>** – Current message sequence number for the *System Parameters*
- 24   *Message*, *Neighbor List Message*, *CDMA Channel List Message*, *Extended System Parameters*
- 25   *Message*, and *Global Service Redirection Message*.
- 26   **COUNTER\_ENABLED<sub>s</sub>** – Timer-based registration indicator. Set to YES if timer-based
- 27   registration is enabled; otherwise, set to NO.
- 28   **CURR\_ACC\_MSG\_SEQ** – Current *Access Parameter Message* sequence number.
- 29   **DAYLT<sub>s</sub>** – Daylight Savings Time indicator.
- 30   **DECORR** – Hashing function input used to decorrelate hashing function applications for
- 31   the same mobile station.
- 32   **DISTANCE** – Distance from registered base station to current base station, used for
- 33   distance-based registration.
- 34   **DSCC<sub>s</sub>** – Digital supervisory color code.
- 35   **ENCRYPT\_MODE<sub>s</sub>** – Current message encryption mode.

- 1    **EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>** – *Extended System Parameters Message* sequence number.
- 2    **EXT\_SYS\_PARAMETER<sub>s</sub>** – *Extended System Parameters Message* sent indicator.
- 3    **FOR\_NID\_REG<sub>s</sub>** – Foreign NID roamer autonomous registration enable.
- 4    **FOR\_SID\_REG<sub>s</sub>** – Foreign SID roamer autonomous registration enable.
- 5    **FRAME\_OFFSET<sub>s</sub>** – Current Traffic Channel frame offset, in units of 1.25 msec.
- 6    **GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub>** – *Global Service Redirection Message* sequence number.
- 7    **GLOBAL\_REDIRECT<sub>s</sub>** – *Global Service Redirection Message* sent indicator.
- 8    **HASH\_KEY** – Hashing function input that determines the return value. Derived from either
- 9    the MIN or ESN, depending upon the application.
- 10   **HOME\_REG<sub>s</sub>** – Home (non-roaming) autonomous registration enable.
- 11   **IMSI\_11\_12<sub>s</sub>** – The 11th and 12th digits of the IMSI.
- 12   **INIT\_PWR<sub>s</sub>** – Initial power offset for Access Channel probes.
- 13   **LC\_STATE<sub>s</sub>** – Long code state obtained from the *Sync Channel Message*.
- 14   **LP\_SEC<sub>s</sub>** – Leap seconds count (offset of CDMA system time from UTC).
- 15   **LTM\_OFF<sub>s</sub>** – Local time offset from UTC, in units of 15 minutes.
- 16   **MAX\_CAP\_SZ<sub>s</sub>** – Maximum number of Access Channel frames in an Access Channel
- 17   message capsule, less 3.
- 18   **MAX\_REQ\_SEQ<sub>s</sub>** – Maximum number of access probe sequences for an Access Channel
- 19   request.
- 20   **MAX\_RSP\_SEQ<sub>s</sub>** – Maximum number of access probe sequences for an Access Channel
- 21   response.
- 22   **MAX\_SLOT\_CYCLE<sub>s</sub>** – Maximum value of the slot cycle index allowed by the current base
- 23   station.
- 24   **MCC<sub>s</sub>** – Mobile country code.
- 25   **MEM<sub>s</sub>** – Analog message encryption mode for CDMA-to-analog handoff.
- 26   **MIN\_P\_REV<sub>s</sub>** – Minimum mobile station protocol revision level required for access to the
- 27   CDMA system.
- 28   **MOB\_TERM<sub>s</sub>** – Mobile station termination indicator. Set to '1' if the mobile station will
- 29   accept mobile station terminated calls in its current roaming status.
- 30   **MSG\_PERSIST<sub>s</sub>** – Persistence modifier for Access Channel message transmissions.
- 31   **MSG\_SEQ\_ACK<sub>s</sub>** – Next message sequence number for messages requiring
- 32   acknowledgement.
- 33   **MSG\_SEQ\_NOACK<sub>s</sub>** – Next message sequence number for messages not requiring
- 34   acknowledgement.

- 1 **MSG\_SEQ\_RCVD<sub>i</sub>** - Received message indicator for message sequence number *i*. Set to
- 2 YES if message sequence number *i* has been received. Set to NO when message sequence
- 3 number  $(i+4)$  modulo 8 has been received.
- 4 **MULT\_NIDS<sub>s</sub>** - Multiple NID storage indicator. Set to '1' if the mobile station may store
- 5 more than one entry in **SID\_NID\_LIST<sub>s</sub>** for each SID.
- 6 **MULT\_SIDS<sub>s</sub>** - Multiple SID storage indicator. Set to '1' if the mobile station may store
- 7 entries in **SID\_NID\_LIST<sub>s</sub>** having different SIDs.
- 8 **NAR\_AN\_CAP<sub>s</sub>** - Narrow analog voice channel capability.
- 9 **NGHBR\_CONFIG<sub>s</sub>** - Neighbor base station channel allocation configuration.
- 10 **NGHBR\_LST\_MSG\_SEQ<sub>s</sub>** - *Neighbor List Message* sequence number.
- 11 **NGHBR\_MAX\_AGE<sub>s</sub>** - Neighbor set maximum age for retention in the set.
- 12 **NGHBR\_PN<sub>s</sub>** - Neighbor base station Pilot Channel PN sequence offset in units of 64 PN
- 13 chips.
- 14 **NID<sub>s</sub>** - Network identification. A network is a subset of the base stations within a cellular
- 15 system.
- 16 **NOM\_PWR<sub>s</sub>** - Nominal transmit power offset. A correction factor to be used by mobile
- 17 stations in the open loop power estimate.
- 18 **NUM\_PREAMBLE<sub>s</sub>** - Number of Traffic Channel preamble frames.
- 19 **NUM\_STEP<sub>s</sub>** - Number of access probes in a single access probe sequence.
- 20 **PAGECH<sub>s</sub>** - Current CDMA Paging Channel number.
- 21 **PAGED** - Indicator for a page match detected while the mobile station is in the *System*
- 22 *Access State*.
- 23 **PAGE\_CHAN<sub>s</sub>** - Number of Paging Channels supported on the current CDMA channel.
- 24 **PAM\_SZ<sub>s</sub>** - Number of frames in the Access Channel preamble, less 1.
- 25 **PARAMETER\_REG<sub>s</sub>** - Parameter-change registration enable.
- 26 **PGSLOT** - Value obtained from the hashing function, used to determine the mobile
- 27 station's assigned Paging Channel slots.
- 28 **PILOT\_ARRIVAL** - Time of occurrence, as measured at the mobile station antenna
- 29 connector, of the earliest arriving usable multipath component of the pilot. The arrival time
- 30 is measured relative to the mobile station's time reference.
- 31 **PILOT\_INC<sub>s</sub>** - Pilot PN sequence offset index increment. The interval between pilots, in
- 32 units of 64 PN chips, for base stations in a system.
- 33 **PILOT\_PN<sub>s</sub>** - Pilot Channel PN sequence offset, in units of 64 PN chips, for a base station.
- 34 **PILOT\_PN\_PHASE** - Calculated Pilot Channel PN phase, in chips, including the PN
- 35 sequence offset and the arrival time relative to the mobile station's time reference.
- 36 **POWER\_DOWN\_REG<sub>s</sub>** - Power down registration enable indicator.



- 1 **POWER\_UP\_REG<sub>s</sub>** – Power up registration enable indicator.
- 2 **PRAT<sub>s</sub>** – Data rate of the Paging Channels.
- 3 **P\_REV<sub>s</sub>** – Protocol revision level supported by a base station.
- 4 **PREF\_MSID\_TYPE<sub>s</sub>** – Preferred mobile station identifier field type.
- 5 **PROBE\_BKOFF<sub>s</sub>** – Access Channel probe backoff range, in slots.
- 6 **PROBE\_PN\_RAN<sub>s</sub>** – Range for hashing function selection of the delay prior to transmission
- 7 of Access Channel probes. Value is  $\log_2(\text{range} + 1)$ .
- 8 **PSIST<sub>s</sub>** – Persistence value for the mobile station's overload class.
- 9 **PWR\_PERIOD\_ENABLE<sub>s</sub>** – Forward power control periodic reporting enabled indicator.
- 10 **PWR\_REP\_DELAY<sub>s</sub>** – Power report delay. The period that the mobile station waits following
- 11 an autonomous *Power Measurement Report* before restarting frame counting for power
- 12 control purposes.
- 13 **PWR\_REP\_FRAMES<sub>s</sub>** – Power control reporting frame count. The number of frames over
- 14 which the mobile station is to count frame errors. Value is  $2 \times \log_2(\text{frames} / 5)$ .
- 15 **PWR\_REP\_THRESH<sub>s</sub>** – Power control reporting threshold. The number of bad frames to be
- 16 received in a measurement period before the mobile station is to generate a *Power*
- 17 *Measurement Report Message*.
- 18 **PWR\_STEP<sub>s</sub>** – Power increment for successive access probes, in units of 1.0 dB.
- 19 **PWR\_THRESH\_ENABLE<sub>s</sub>** – Forward power control threshold reporting enabled indicator.
- 20 **RA** – Random access channel number. The Access Channel number generated (pseudo-
- 21 randomly) by the mobile station.
- 22 **RAND<sub>s</sub>** – Authentication random challenge value.
- 23 **RANDOM\_TIME** – Random time. A portion of SYS\_TIME used to seed the random number
- 24 generator.
- 25 **REDIRECTION<sub>s</sub>** – Service redirection indicator. Set to enabled to indicate that service
- 26 redirection is currently in effect; otherwise set to disabled.
- 27 **REDIRECT\_REC<sub>s</sub>** – Holds the service redirection criteria specified in the redirection record
- 28 of the most recently received *Global Service Redirection Message* or *Service Redirection*
- 29 *Message*.
- 30 **REG\_COUNT<sub>s</sub>** – Timer-based registration count. The timer-based registration counter.
- 31 **REG\_COUNT\_MAX<sub>s</sub>** – Timer-based registration count limit. The timer-based registration
- 32 counter expiration value computed from REG\_PRD<sub>r</sub>.
- 33 **REG\_DIST<sub>s</sub>** – Registration distance. Distance from last registration that causes a distance-
- 34 based registration to occur.
- 35 **REG\_ENABLED<sub>s</sub>** – Autonomous registrations enabled indicator.
- 36 **REGISTERED<sub>s</sub>** – Mobile station registered indicator.

- 1 **REG\_PRD<sub>s</sub>** – Registration period. The time interval between timer-based registrations.  
2 Value is  $4 \times \log_2(\text{time} / 0.08 \text{ s})$ .
- 3 **REG\_PSIST<sub>s</sub>** – Persistence modifier for registration accesses (except ordered registrations).
- 4 **REG\_ZONE<sub>s</sub>** – Registration zone number of the base station.
- 5 **RETRY\_COUNT<sub>s</sub>** – Message retransmission count. Counter used to determine when the  
6 maximum number of retransmissions has been exceeded for a given message.
- 7 **RETURN\_IF\_FAIL<sub>s</sub>** – Return if fail indicator. Set to '1' to indicate that mobile station is to  
8 return to the system from which it was redirected if it fails to acquire service on a system  
9 using specified redirection criteria. Otherwise, set to '0'.
- 10 **RS** – Inter-probe sequence backoff. The delay in slots generated (pseudorandomly) by the  
11 mobile station following an unsuccessful access probe sequence or prior to the first access  
12 probe in a response attempt.
- 13 **RT** – Inter-probe backoff. The delay in slots generated (pseudorandomly) by the mobile  
14 station following an unacknowledged access probe.
- 15 **SCC<sub>s</sub>** – SAT color code for analog channel assignment and CDMA-to-analog handoff.
- 16 **SERVSYS<sub>s</sub>** – Selected serving system indicator. Set to SYS\_A if the current CDMA Channel  
17 is in system A's frequency band. Otherwise set to SYS\_B.
- 18 **SID<sub>s</sub>** – System Identifier.
- 19 **SID\_NID\_LIST<sub>s</sub>** – Registration SID, NID list. The SID, NID pairs in which the mobile station  
20 has registered.
- 21 **SLOT\_CYCLE\_INDEX<sub>s</sub>** – Slot cycle index. Equal to the smaller of SLOT\_CYCLE\_INDEX<sub>p</sub>  
22 and the received maximum slot cycle index.
- 23 **SLOT\_NUM** – Paging Channel slot number.
- 24 **SO\_CUR<sub>s</sub>** – Active service option number. The number of the service option active in the  
25 mobile station.
- 26 **SO\_REQ<sub>s</sub>** – Service option request number. The number of the service option requested by  
27 the mobile station.
- 28 **SRCH\_WIN\_A<sub>s</sub>** – Search window size for the Active Set and Candidate Set.
- 29 **SRCH\_WIN\_N<sub>s</sub>** – Search window size for the Neighbor Set.
- 30 **SRCH\_WIN\_R<sub>s</sub>** – Search window size for the Remaining Set.
- 31 **SYS\_PAR\_MSG\_SEQ<sub>s</sub>** – *System Parameters Message* sequence number.
- 32 **SYS\_TIME<sub>s</sub>** – Current value of CDMA system time as received in the *Sync Channel*  
33 *Message*.
- 34 **TA** – Acknowledgement response timeout.
- 35 **T\_ADD<sub>s</sub>** – Pilot detection threshold.
- 36 **T\_COMP<sub>s</sub>** – Active Set versus Candidate Set comparison threshold.

- 1 **T\_DROP<sub>s</sub>** – Pilot drop threshold.
- 2 **TOTAL\_ZONES<sub>s</sub>** – Number of registration zones to be retained in ZONE\_LIST<sub>s</sub>.
- 3 **TOT\_FRAMES<sub>s</sub>** – Total frames received. The total number of received frames, counted for
- 4 Forward Traffic Channel power control.
- 5 **T\_TDROP<sub>s</sub>** – Pilot drop timer value.
- 6 **VMAC<sub>s</sub>** – Analog voice mobile station attenuation code for analog channel assignment or
- 7 CDMA-to-analog handoff.
- 8 **ZONE\_LIST<sub>s</sub>** – Registration zone list. List of zones in which the mobile station has
- 9 registered.
- 10 **ZONE\_TIMER<sub>s</sub>** – Zone timer length.

## 11 1.2 CDMA System Time

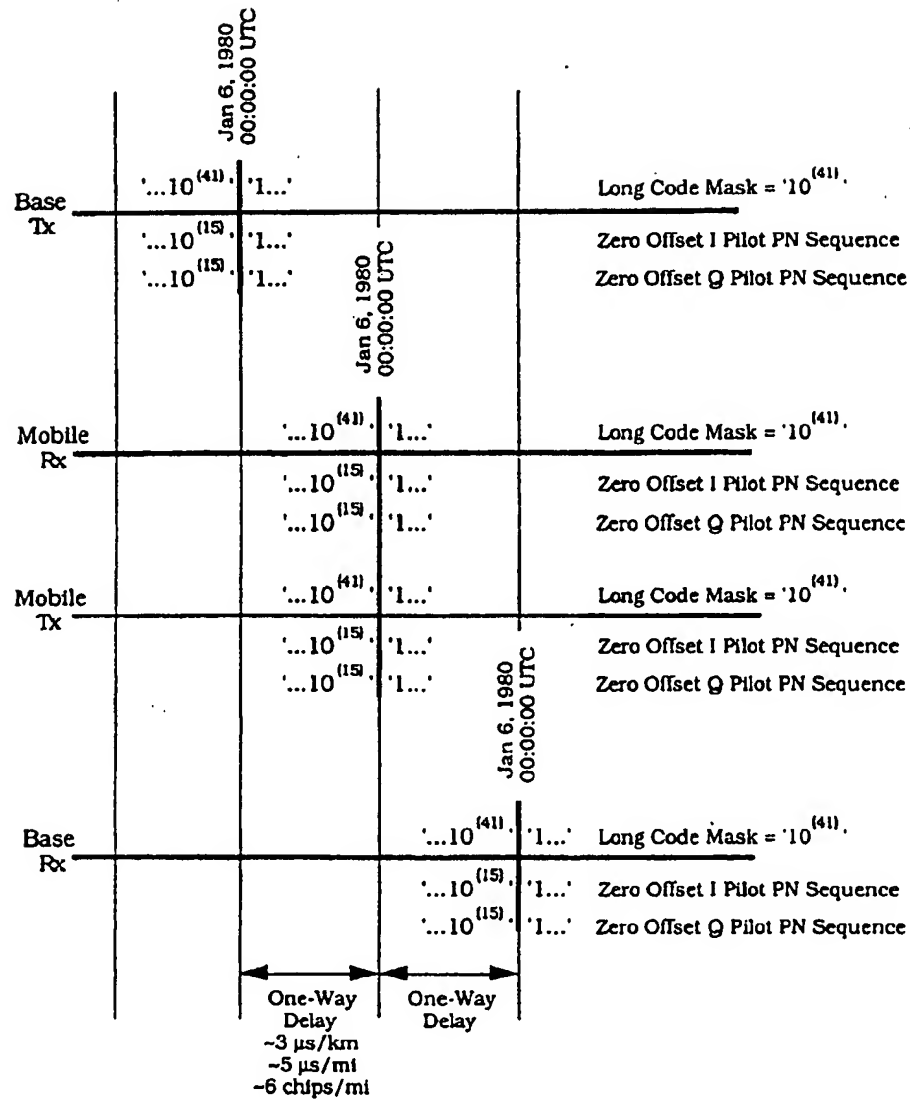
12 All base station digital transmissions are referenced to a common CDMA system-wide time  
 13 scale that uses the Global Positioning System (GPS) time scale, which is traceable to and  
 14 synchronous with Universal Coordinated Time (UTC). GPS and UTC differ by an integer  
 15 number of seconds, specifically the number of leap second corrections added to UTC since  
 16 January 6, 1980. The start of CDMA System Time is January 6, 1980 00:00:00 UTC, which  
 17 coincides with the start of GPS time.

18 System Time keeps track of leap second corrections to UTC but does not use these  
 19 corrections for physical adjustments to the System Time clocks.

20 Figure 1.2-1 shows the relation of System Time at various points in the CDMA system. The  
 21 long code and the zero offset pilot PN sequence for the I and Q channels (see 6.1.3.1.8,  
 22 6.1.3.1.9, 7.1.3.1.6, and 7.1.3.1.9) are shown and their initial states at the start of System  
 23 Time. The initial state of the long code is that state in which the output of the long code  
 24 generator is the first '1' output following 41 consecutive '0' outputs, with the binary mask  
 25 consisting of '1' in the MSB followed by 41 '0's. Referring to the shift register in Figure  
 26 6.1.3.1.8-1, this implies that the 42nd bit in the shift register equals '1' and that all other  
 27 bits in the shift register are equal to '0'. The initial state of the pilot PN sequence, both I  
 28 and Q, is that state in which the output of the pilot PN sequence generator is the first '1'  
 29 output following 15 consecutive '0' outputs. The alignment of the initial states of the long  
 30 code and the pilot PN sequence does not occur again for more than 37 centuries.

31 From Figure 1.2-1, note that the System Time at various points in the transmission and the  
 32 reception processes is the absolute time referenced at the base station antenna offset by the  
 33 one-way or round-trip delay of the transmission, as appropriate. Time measurements are  
 34 referenced to the transmit and receive antennas of the base station and the RF connector of  
 35 the mobile station. The precise zero instant of System Time is the midpoint between the  
 36 last '0' of the 41 consecutive '0' outputs and the succeeding '1' of the long code using the  
 37 binary mask consisting of '1' in the MSB followed by 41 '0's.

38 Wherever this document refers to CDMA System time in frames, it is taken to mean an  
 39 integer value  $t$  such that:  $t = \lfloor s/0.02 \rfloor$ , where  $s$  represents System Time in seconds.



**Note:** Time measurements are made at the antennas of base stations and the RF connectors of the mobile stations.

$0^{(n)}$  denotes a sequence of n consecutive zeroes.

**Figure 1.2-1. System Time Line**

### 1.3 Tolerances

#### 1.3.1 Analog System Tolerances

Unless otherwise specified, all call-processing timers and call-processing timing values have a tolerance of  $\pm 10\%$ . Tolerances of other parameters are provided for guidance only. Refer to IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations" and IS-97 "Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations," for minimum standards, definitions, tolerances, and measurement methods.

#### 1.3.2 CDMA Tolerances

Unless otherwise specified, all values indicated in Sections 6, 7, and the referenced appendices are exact unless an explicit tolerance is stated. Also refer to IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations" and IS-97 "Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

### 1.4 Message Forward Compatibility Rules

In the message formats used between the mobile stations and base stations, some bits are marked as reserved (RSVD or RESERVED). Some or all of these reserved bits may be used in the future for additional messages. Therefore, all mobile stations and base stations shall set all bits that they are programmed to treat as reserved bits to '0' (zero) in all messages that they transmit. All mobile stations and base stations shall ignore the state of all bits that they are programmed to treat as reserved bits in all messages that they receive.

If a message body contains additional bits following the bits specified by the formatting requirements of the message, the additional bits shall be ignored.

**2 REQUIREMENTS FOR MOBILE STATION ANALOG OPERATION**

The optional narrow analog mode of operation as defined in TIA/EIA/IS-91, Section 2, is incorporated into this standard for the mobile stations that have optionally implemented the narrow analog mode.

Mobile stations optionally implementing Short Message Service in the analog mode shall support Alert With Info SMS delivery (see 2.6.4 and 2.7.2.1) on the traffic channel. In addition, they shall support extended protocol enhanced services operation as defined in TIA/EIA/IS-91, Section 2, on the control channel and on the traffic channel for messages less than or equal to 32 digits or 14 characters.

(See also Section 4 for Mobile Station Options.)

**2.1 Transmitter****2.1.1 Frequency Parameters****2.1.1.1 Channel Spacing and Designation**

Channel spacing shall be 30 kHz and the dual-mode mobile station transmit channel at 825.030 MHz (and the corresponding base station transmit channel at 870.030 MHz) shall be termed channel number 1. The 20 MHz range of channels 1 through 666 as shown in Table 2.1.1.1-1 for System A and System B is basic. The additional 5 MHz of channels 667 through 799 and (wrap-around) 991 through 1023 for extending System A (A', A'') and B (B') is mandatory. The station class mark (SCM, see 2.3.3) shall be set appropriately.

Table 2.1.1.1-1. Channel Numbers and Frequencies

System	Bandwidth (MHz)	Number of Channels	Boundary Channel Numbers	Transmitter Center Frequency (MHz)	
				Mobile	Base
(Not used)		1	(990)	(824.010)	(869.010)
A'	1	33	991	824.040	869.040
			1023	825.000	870.000
A	10	333	1	825.030	870.030
			333	834.990	879.990
B	10	333	334	835.020	880.020
			666	844.980	889.980
A'	1.5	50	667	845.010	890.010
			716	846.480	891.480
B'	2.5	83	717	846.510	891.510
			799	848.970	893.970

In the above, the center frequency in MHz corresponding to the channel number (expressed as N) is calculated as follows.

Transmitter	Channel Number	Center Frequency (MHz)
Mobile	$1 \leq N \leq 799$	$0.030 N + 825.000$
	$990 \leq N \leq 1023$	$0.030 (N - 1023) + 825.000$
Base	$1 \leq N \leq 799$	$0.030 N + 870.000$
	$990 \leq N \leq 1023$	$0.030 (N - 1023) + 870.000$

2

## 3 2.1.1.2 Frequency Tolerance

- 4 The mobile station carrier frequency must be maintained within  $\pm 2.5$  parts per million  
 5 (ppm) of any assigned channel frequency, except during channel switching (see 2.1.2.1).  
 6 This tolerance must be maintained over the ambient temperature range of  $-30^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ ,  
 7 and over the supply voltage range of  $\pm 15$  percent from the nominal value.

## 2.1.2 Power Output Characteristics

### 2.1.2.1 Carrier On/Off Conditions

The carrier-off condition is defined as a power output at the transmitting antenna connector not exceeding -60 dBm. When commanded to the carrier-on condition on a reverse control channel, a mobile station transmitter must come to within 3 dB of the specified output power (see 2.1.2.2) and to within the required stability (see 2.1.1.2) within 2 ms. Conversely, when commanded to the carrier-off condition, the transmit power must fall to a level not exceeding -60 dBm within 2 ms. Whenever a transmitter is more than 1 kHz from its initial or final value during channel switching, the transmitter carrier must be inhibited to a power output level not greater than -60 dBm.

### 2.1.2.2 Power Output and Power Control

The maximum effective radiated power (ERP) with respect to a half wave dipole for any class mobile station transmitter is 8 dBW (6.3 Watts). An inoperative antenna assembly must not degrade the spurious emission levels as defined in 2.1.4.2. The nominal ERP for each class of mobile station transmitter is: Class I 6 dBW (4.0 Watts), Class II 2 dBW (1.6 Watts), Class III -2 dBW (0.6 Watts).

A mobile station transmitter must be capable of reducing or increasing power on command from a base station specifying the power level 0 to 7. The nominal levels are given in Table 2.1.2.2-1. Each power level must be maintained within the range of +2 dB/-4 dB of its nominal level over the ambient temperature range of -30°C to +60°C, and over the supply voltage range of  $\pm 10$  percent from the nominal value, accumulative. A power change command will raise or lower power in increments of 4 dB.

All classes of mobile stations will respond to a CMAC or a VMAC command by setting their transmit power to the appropriate Mobile Station Power Level, regardless of prior Mobile Station Power Level.

Table 2.1.2.2-1. Mobile Station Nominal Power Levels

Mobile Station Power Level (PL)	Mobile Attenuation Code (MAC)	Nominal ERP (dBW) for Mobile Station Power Class		
		I	II	III
0	000	6	2	-2
1	001	2	2	-2
2	010	-2	-2	-2
3	011	-6	-6	-6
4	100	-10	-10	-10
5	101	-14	-14	-14
6	110	-18	-18	-18
7	111	-22	-22	-22



1   **2.1.3 Modulation Characteristics**

2   **2.1.3.1 Voice Signals**

3   The modulator is preceded by the following five voice-processing stages (in the order listed):

- 4       • Transmit Audio Level Adjustment
- 5       • Compressor
- 6       • Pre-Emphasis
- 7       • Deviation Limiter
- 8       • Post Deviation-Limiter Filter

9   Pending the generation of a complete speech transmission plan for dual-mode cellular  
10 systems, the following requirements shall be met to ensure compatibility with the  
11 transmission plan for fixed digital speech networks.

12   **2.1.3.1.1 Compressor**

13   This stage is the compressor portion of a 2:1 syllabic compandor. For every 2 dB change in  
14 input level to a 2:1 compressor within its operating range, the change in output level is a  
15 nominal 1 dB. The compressor must have a nominal attack time of 3 ms and a nominal  
16 recovery time of 13.5 ms as defined by CCITT Recommendation G.162. The nominal  
17 reference input level to the compressor is that corresponding to a 1000 Hz acoustic tone at  
18 the expected nominal speech volume level. This level must produce a nominal  $\pm 2.9$  kHz  
19 peak frequency deviation of the transmitted carrier.

20   **2.1.3.1.2 Pre-Emphasis**

21   The pre-emphasis characteristic must have a nominal +6 dB/octave response between 300  
22 and 3000 Hz.

23   **2.1.3.1.3 Deviation Limiter**

24   For audio (voice) inputs applied to the transmitter voice-signal processing stages, a dual-  
25 mode mobile station operating in analog mode must limit the instantaneous frequency  
26 deviation to  $\pm 12$  kHz. This requirement excludes supervision signals (see 2.4) and  
27 wideband data signals (see 2.1.3.2).

**2.1.3.1.4 Post Deviation-Limiter Filter**

The deviation limiter must be followed by a low-pass filter whose characteristics are:

Frequency Band	Attenuation Relative to 1000 Hz
3000 - 5900 Hz	$\geq 40 \log (f/3000)$ dB
5900 - 6100 Hz	$\geq 35$ dB
6100 - 15000 Hz	$\geq 40 \log (f/3000)$ dB
above 15000 Hz	$\geq 28$ dB

**2.1.3.1.5 Transmit Level Adjustment**

The mobile station shall have a transmit objective loudness rating (TOLR) equal to -46 dB. when transmitting to a reference base station (see 3.2.2.1). The loudness ratings are described in IEEE Standard 661-1979. Measurement techniques are described in IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

**2.1.3.2 Wideband Data Signals****2.1.3.2.1 Encoding**

The reverse control channel (RECC) and reverse voice channel (RVC) wideband data streams (see 2.7) must be further encoded such that each nonreturn-to-zero binary one is transformed to a zero-to-one transition, and each nonreturn-to-zero binary zero is transformed to a one-to-zero transition.

**2.1.3.2.2 Modulation and Polarity**

The filtered wideband data stream must then be used to modulate the transmitter carrier using direct binary frequency shift keying. A one (i.e., high state) into the modulator must correspond to a nominal peak frequency deviation 8 kHz above the carrier frequency, and a zero into the modulator must correspond to a nominal peak frequency deviation 8 kHz below the carrier frequency.

1    **2.1.4 Limitations on Emissions**

2    **2.1.4.1 Bandwidth Occupied**

3    Modulation products outside the region  $\pm 20$  kHz from the carrier shall not exceed a level of  
4    26 dB below the unmodulated carrier. Modulation products outside the region of  $\pm 45$  kHz  
5    from the carrier shall not exceed a level of 45 dB below the unmodulated carrier.  
6    Modulation products outside the region of  $\pm 90$  kHz from the carrier shall not exceed a level  
7    of (a) 60 dB below the unmodulated carrier, or (b) 43 plus  $10 \log_{10}$  (mean output power in  
8    Watts) dB below the unmodulated carrier, whichever is the higher level of power.  
9    Measurement techniques are defined in the current IS-98 "Recommended Minimum  
10   Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile  
11   Stations."

12   **2.1.4.2 Conducted Spurious Emissions**

13   Refer to IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband  
14   Spread Spectrum Cellular Mobile Stations."

15   **2.1.4.3 Radiated Spurious Emissions**

16   Refer to IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband  
17   Spread Spectrum Cellular Mobile Stations."

18   **2.2 Receiver**

19   **2.2.1 Frequency Parameters**

20   **2.2.1.1 Channel Spacing and Designation**

21   Channel spacing shall be 30 kHz and the dual-mode mobile station receive channel at  
22   870.030 MHz (and the corresponding base station receive channel at 825.030 MHz) shall be  
23   termed channel number 1. The 20 MHz range of channels 1 through 666 as shown in  
24   Table 2.1.1.1-1 for System A and System B is basic. The additional 5 MHz of channels 667  
25   through 799 and (wrap-around) 991 through 1023 for extending Systems A and B is  
26   mandatory. In either case, the station class mark (SCM, see 2.3.3) shall be set  
27   appropriately.

28   **2.2.2 Demodulation Characteristics**

29   **2.2.2.1 Voice Signals**

30   The demodulator is followed by the following three voice-signal processing stages:

- 31       • De-emphasis
- 32       • Expander
- 33       • Receive Audio Level Adjustment

1 Pending the generation of a complete speech transmission plan for dual-mode cellular  
2 systems, the following requirements shall be met to ensure compatibility with the  
3 transmission plan for fixed digital speech networks.

4 2.2.2.1.1 De-Emphasis

5 The de-emphasis characteristic must have a nominal -6 dB per octave response between  
6 300 and 3000 Hz.

7 2.2.2.1.2 Expander

8 This stage is the expander portion of a 2:1 syllabic compandor. For every 1 dB change in  
9 input level to a 1:2 expander, the change in output level is a nominal 2 dB. The signal  
10 expansion must follow all other demodulation signal processing (including the 6 dB/octave  
11 de-emphasis and filtering). The expander must have a nominal attack time of 3 ms and a  
12 nominal recovery time of 13.5 ms as defined by CCITT Recommendation G.162. The  
13 nominal reference input level to the expander is that corresponding to a 1000 Hz tone from  
14 a carrier with a  $\pm 2.9$  kHz peak frequency deviation.

15 2.2.2.1.3 Audio Level Adjustment

16 The mobile station shall have a nominal receive objective loudness rating (ROLR) equal to  
17 51 dB when receiving from a reference base station (see 3.1.3.1). The loudness ratings are  
18 described in IEEE Standard 661-1979. Measurement techniques are described in IS-98  
19 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread  
20 Spectrum Cellular Mobile Stations."

21 2.2.3 Limitations on Emissions

22 2.2.3.1 Conducted Spurious Emissions

23 2.2.3.1.1 Suppression Inside Cellular Band

24 Any RF signals emitted in the mobile station's receive band must not exceed -80 dBm, as  
25 measured at the antenna connector. Additionally, signals in the mobile station's transmit  
26 band must not exceed -60 dBm, as measured at the antenna connector.

27 2.2.3.1.2 Suppression Outside Cellular Band

28 Refer to IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband  
29 Spread Spectrum Cellular Mobile Stations."

30 2.2.3.2 Radiated Spurious Emissions

31 Refer to IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband  
32 Spread Spectrum Cellular Mobile Stations."

#### 2.2.4 Other Receiver Parameters

System performance is predicated upon receivers meeting IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

### 2.3 Security and Identification

#### 2.3.1 Mobile Identification Number

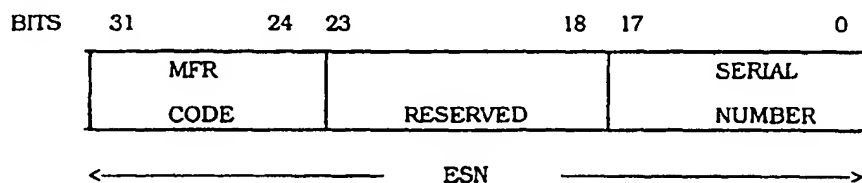
Mobile stations operating in the analog mode use the mobile identification number (MIN). Mobile stations operating in the CDMA mode use the International Mobile Station Identity (IMSI) (see 6.3.1).

The MIN is a 34-bit number. The MIN shall be equal to IMSI<sub>S</sub> (see 6.3.1). The 10-bit MIN2<sub>p</sub> shall be equal to IMSI<sub>S2p</sub> and the 24-bit MIN1<sub>p</sub> shall be equal to IMSI<sub>S1p</sub>. Storage for MIN1<sub>p</sub> and MIN2<sub>p</sub> may be in common with that for IMSI<sub>S<sub>p</sub></sub>.

#### 2.3.2 Electronic Serial Number (ESN)

The ESN is a 32-bit binary number that uniquely identifies the mobile station to any cellular system. It must be factory-set and not readily alterable in the field. Modification of the ESN will require a special facility not normally available to subscribers. The circuitry that provides the ESN must be isolated from fraudulent contact and tampering. Electronic storage devices mounted in sockets or connected with a cable are deemed not to comply with this requirement. Attempts to change the ESN circuitry must render the mobile station inoperative.

The bit allocation of the ESN shall be as follows:



At the time of issuance of initial type acceptance, the manufacturer shall be assigned a Manufacturer's (MFR) Code within the eight most-significant bits (bit 31 through bit 24) of the 32-bit serial number. Bits 23 through 18 shall be reserved (initially all zero), and bits 17 through 0 shall be uniquely assigned by each manufacturer. When a manufacturer has used substantially all possible combinations of serial numbers within bits 17 through 0, the manufacturer may submit notification to the FCC. The FCC will allocate the next sequential binary number within the reserve block (bits 23 through 18).

#### 2.3.3 Station Class Mark

Class-of-station information referred to as the station class mark (SCM<sub>p</sub>) must be stored in a mobile station. The digital representation of this class mark is specified in Table 2.3.3-1.

Table 2.3.3-1. Station Class Mark

Function	Bit(s)	Setting
Reserved	7	Always 0 0XXXXXXX
Dual Mode	6	CDMA Only X0XXXXXX Dual Mode X1XXXXXX
Slotted Class	5	Non-Slotted XX0XXXXX Slotted XX1XXXXX
IS-54 Power Class	4	Always 0 XXX0XXXX
25 MHz Bandwidth	3	Always 1 XXXX1XXX
Transmission	2	Continuous XXXXX0XX Discontinuous XXXXX1XX
Power Class	1 - 0	Class I XXXXXX00 Class II XXXXXX01 Class III XXXXXX10 Reserved XXXXXX11

The least significant 5 bits of the dual-mode SCM are used when operating in the analog mode (see 2.7.1.1); all bits are used when operating in the CDMA mode.

#### 2.3.4 Registration Memory

(See 6.3.4 for registration memory when operating in the CDMA mode.)

##### 2.3.4.1 Autonomous Registration Memory

A single 21-bit (20 data bits plus an overflow bit) next registration indicator (NXTREG<sub>s-p</sub>) and corresponding 15-bit system identification indicator (SID<sub>s-p</sub>) pair must be retained when the mobile station power is turned off. The data retention time under power-off condition must be longer than 48 hours. If the integrity of the stored data can not be guaranteed after the mobile station is disconnected from the vehicle battery, then the memory must be set to zero when power is re-applied to the mobile station.

##### 2.3.4.2 Location Area Memory

A 12-bit location area identifier (LOCAID<sub>s-p</sub>) must be stored in the mobile station and used to identify changes in location area (see 2.6.2.1). The LOCAID<sub>s-p</sub> value must be retained when the mobile station power is turned off. The data retention time under power-off condition must be longer than 48 hours. If the integrity of the stored data cannot be guaranteed after the mobile station is disconnected from the vehicle battery, then the memory must be set to zero when power is re-applied to the mobile station.

1 A 1-bit power-up registration identifier (PUREG<sub>s-p</sub>) must be stored in the mobile station  
 2 and used to identify changes in the power-up registration flag (see 2.6.2.1). The PUREG<sub>s-p</sub>  
 3 value must be retained when the mobile station power is turned off. The data retention  
 4 time under power-off condition must be longer than 48 hours. If the integrity of the stored  
 5 data cannot be guaranteed after the mobile station is disconnected from the vehicle battery,  
 6 then the memory must be set to zero when power is re-applied to the mobile station.

#### 7 2.3.5 Access Overload Class

8 A 4-bit overload class indicator (ACCOLC<sub>p</sub>) is used to identify which overload class controls  
 9 access attempts by the mobile station (see 2.6.3.4 and 6.6.3.1).

10 The mobile station shall store a 4-bit access overload class (ACCOLC<sub>p</sub>). Mobile stations  
 11 that are not for test or emergency use should be assigned to overload classes ACCOLC 0  
 12 through ACCOLC 9 according to a uniform distribution. Mobile stations designated for test  
 13 use should be assigned to ACCOLC 10, while mobile stations designated for emergency use  
 14 should be assigned to ACCOLC 11. ACCOLC 12 through ACCOLC 15 are reserved.<sup>1</sup>

#### 15 2.3.6 Extended Address Method

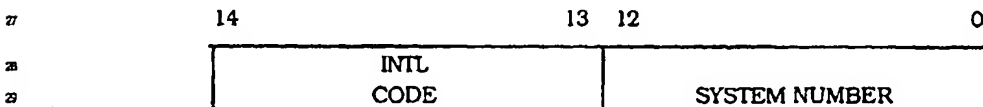
16 A 1-bit access method indicator (EX<sub>p</sub>) must be stored in the mobile station and used to  
 17 determine if the extended address word must be included in all access attempts (see  
 18 2.6.3.7).

#### 19 2.3.7 First Paging Channel

20 An 11-bit first paging channel (FIRSTCHP<sub>p</sub>) must be stored in the mobile station and used  
 21 to identify the channel number of the first paging channel when the mobile station is  
 22 "home" (see 2.6.1.1.2).

#### 23 2.3.8 Home System Identification

24 A 15-bit system identification indicator (HOME\_SID<sub>p</sub>) must be stored in the mobile station  
 25 and used to identify the mobile station's home system (see 2.6.1.1.2). The bit allocation of  
 26 the system identification indicator shall be as follows:



<sup>1</sup>For more information, refer to EIA Telecommunications Systems Bulletin No. 16 (March 1985), "Assignment of Access Overload Classes in the Cellular Telecommunications Services."

The international (INTL) codes (bits 14 and 13) shall be allocated as follows:

BIT 14	BIT 13	
0	0	United States
0	1	Other countries
1	0	Canada
1	1	Mexico

Bits 12 through 0 will be assigned to each U.S. system by the FCC. See EIA/TIA Telecommunications Services Bulletin TSB29 (International Implementation of Cellular Radiotelephone Systems Compliant with ANSI/EIA/TIA-553) for international SID coding requirements.

#### 2.3.9 Local Control Option

A means must be provided within the mobile station to enable or disable the local control option.

#### 2.3.10 Preferred Operation Selection

##### 2.3.10.1 Preferred System

A means shall be provided within the mobile station to identify the preferred system as either System A or System B. In addition, the mobile station may provide a means for allowing operation only with System A or System B.

##### 2.3.10.2 Preferred CDMA or Analog

A means may be provided within the mobile station to identify the preferred operation type as either CDMA mode or analog mode. In addition, the mobile station may provide a means for allowing operation only with the analog or CDMA mode.

##### 2.3.11 Discontinuous Transmission

Discontinuous transmission refers to the ability of certain mobile stations to switch autonomously between two transmitter power-level states ("DTX-high" and "DTX-low") while the mobile station is in the conversation task on an analog voice channel. Discontinuous transmission is not permitted in any task other than the conversation task.

In the DTX-high state, the transmitter radiates at the power level indicated by the most recent power-controlling order (initial-voice-channel-designation, handoff, or power-change order) received by the mobile station. In this state the mobile station must transpond SAT at all times, except for the normal suspensions of SAT covered in 2.4.1.



1 In the DTX-low state, the transmitter radiates at a power level determined by the DTX-high-  
2 state power level ("DTX-high level") and the  $DTX_s$  indicator that is copied from the DTX field  
3 in Word 2 of the System Parameter Overhead Message (see 3.7.1.2.1). If the  $DTX_s$  indicator  
4 is set to '10', the DTX-low level must equal or exceed a level that is 8 dB below the DTX-  
5 high level. If the  $DTX_s$  indicator is set to '11', no minimum applies to the DTX-low level;  
6 that is, the transmitter may be turned off or it may be turned on at any level up to the DTX-  
7 high level. In the DTX-low state, the mobile station must not transpond SAT. If the  $DTX_s$   
8 indicator is set to '00', only the DTX-high state (that is "continuous transmission") is  
9 permitted. The  $DTX_s$  indicator setting of '01' is reserved.

10 When a mobile station switches from the DTX-high state to the DTX-low state, it must pass  
11 through a transition state in which the transmitted power is at the DTX-high level but SAT  
12 is not transponded. The sequence must be as follows: starting in the DTX-high state, enter  
13 the transition state; remain in the transition state 300 ms; enter the DTX-low state.

14 When a mobile station switches from the DTX-low state to the DTX-high state, it must  
15 begin transponding SAT immediately after changing the power level, except for the normal  
16 suspensions of SAT covered in 2.4.1. Each time that the mobile station enters the DTX-  
17 high state, it must remain in that state for at least 1.5 seconds, unless it enters the DTX-  
18 high state in response to an audit order in which case it must remain in that state for at  
19 least 5 seconds. (Note that any requirement for the mobile station to remain in the DTX-  
20 high state for a certain minimum time interval does not prohibit the mobile station from  
21 leaving the conversation state before the interval ends.)

#### 22 2.3.12 Authentication, Encryption of Signaling Information/User Data

23 Note: Messages received during the authentication procedures that are unrelated to the  
24 authentication process shall also be processed.

##### 25 2.3.12.1 Authentication

26 Authentication is the process by which information is exchanged between a mobile station  
27 and base station for the purpose of confirming the identity of the mobile station. A  
28 successful outcome of the authentication process occurs only when it can be demonstrated  
29 that the mobile station and base station possess identical sets of shared secret data.

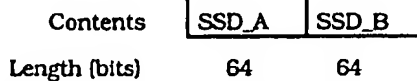
30 The authentication algorithms are described in "Common Cryptographic Algorithms." The  
31 interface (input and output parameters) for the algorithms is described in "Interface  
32 Specification for Common Cryptographic Algorithms." Table 2.3.12.1-1 summarizes the  
33 setting of the input parameters of the Auth\_Signature procedure for each of its uses in this  
34 standard.

**Table 2.3.12.1-1. Auth\_Signature Input Parameters**

Procedure	RAND_CHALLENGE	ESN	AUTH_- DATA	SSD_- AUTH	SAVE_- REGISTERS
Registration (2.3.12.1.4)	RAND <sub>s</sub>	ESN <sub>p</sub>	MIN1	SSD_A	FALSE
Unique Challenge (2.3.12.1.5)	RANDU and 8 LSBs of MIN2	ESN <sub>p</sub>	MIN1	SSD_A	FALSE
Originations (2.3.12.1.6)	RAND <sub>s</sub>	ESN <sub>p</sub>	Digits	SSD_A	TRUE
Terminations (2.3.12.1.7)	RAND <sub>s</sub>	ESN <sub>p</sub>	MIN1	SSD_A	TRUE
Base Station Challenge (2.3.12.1.8)	RANDBS	ESN <sub>p</sub>	MIN1	SSD_A - NEW	FALSE

#### 2.3.12.1.1 Shared Secret Data (SSD)

SSD is a 128-bit pattern stored in the mobile station (in semi-permanent memory) and readily available to the base station. As depicted in Figure 2.3.12.1.1-1, SSD is partitioned into two distinct subsets. Each subset is used to support a different process.

**Figure 2.3.12.1.1-1. Partitioning of SSD**

Specifically,

SSD\_A is used to support the authentication procedures; and

SSD\_B is used to support CDMA voice privacy (see 6.3.12.3), and message confidentiality for CDMA and analog.

SSD is generated according to the procedures specified in 2.3.12.1.8 or 6.3.12.1.9.

#### 2.3.12.1.2 Random Challenge Memory (RAND)

A 32-bit value held in the mobile station. When operating in the analog mode, it is the concatenation of the last RAND1\_A and RAND1\_B values received in Random Challenge A and Random Challenge B Global Action Messages appended to the overhead message train of the Forward Analog Control Channel. Both RAND1\_A and RAND1\_B must be received on the same control channel and in the same Overhead Message Train in order for a valid RAND to exist. When operating in the CDMA Mode, it is equal to the RAND value received in the last Access Parameters Message (see 7.7.2.3.2.2) of the CDMA Paging Channel.

1 RAND<sub>s</sub> is used in conjunction with SSD\_A and other parameters, as appropriate, to  
2 authenticate mobile station originations, terminations and registrations.

3 2.3.12.1.3 Call History Parameter (COUNT<sub>s-p</sub>)

4 A modulo-64 count held in the mobile station. COUNT<sub>s-p</sub> is updated at the mobile upon  
5 receipt of a Parameter Update Order (see Table 3.7.1.1-1) on the FVC. COUNT<sub>s-p</sub> is also  
6 updated by the mobile station when a *Parameter Update Order* is received on the CDMA  
7 Forward Traffic Channel (see 7.7.4).

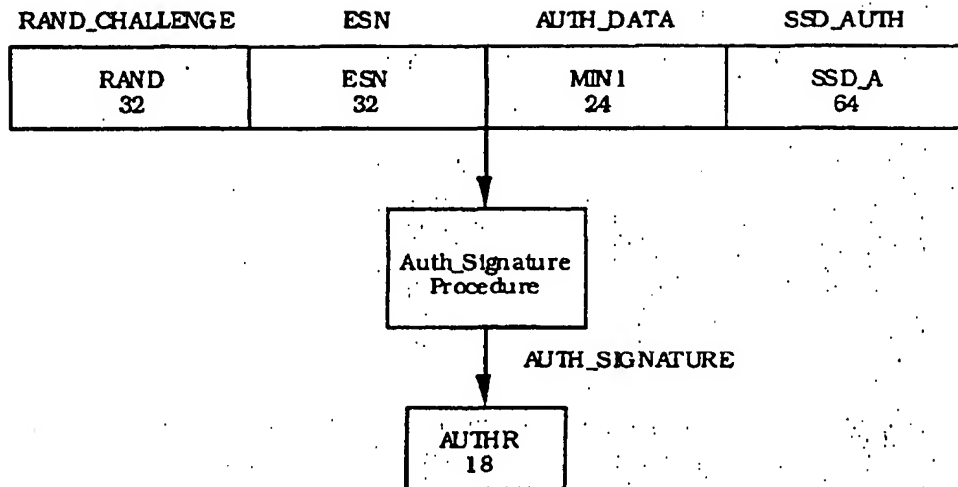
8 2.3.12.1.4 Authentication of Mobile Station Registrations

9 When the information element AUTH in the System Parameter Overhead Message is set to  
10 1, and the mobile station attempts to register, the following authentication-related  
11 procedures shall be performed:

- 12 • In the mobile station,
  - 13 • set the input parameters of the Auth\_Signature procedure (see "Interface  
14 Specification for Common Cryptographic Algorithms," section 2.3) as  
15 illustrated in Figure 2.3.12.1.4-1;
  - 16 • set the SAVE\_REGISTERS input parameter to FALSE;
  - 17 • execute the Auth\_Signature procedure;
  - 18 • set AUTHR equal to the 18-bit output AUTH\_SIGNATURE;
  - 19 • send AUTHR together with RANDC (eight most significant bits of RAND)  
20 and COUNT<sub>s-p</sub> to the base station (Authentication Word C of RECC  
21 Autonomous Registration Order Message).
- 22 • At the base station,
  - 23 • compare the received values for RANDC, and optionally COUNT, with the  
24 internally stored values associated with the received MIN/ESN;
  - 25 • compute AUTHR as described above, except use the internally stored  
26 value of SSD\_A; and
  - 27 • compare the value for AUTHR computed internally with the value of  
28 AUTHR received from the mobile station.

29 If any of the comparisons by the base station fail, the base station may deem the  
30 registration attempt unsuccessful, initiate the Unique Challenge-Response Procedure (see  
31 2.3.12.1.5), or commence the process of updating the SSD (see 2.3.12.1.8).

32



**Figure 2.3.12.1.4-1. Computation of AUTHR for Authentication of Mobile Station Registrations**

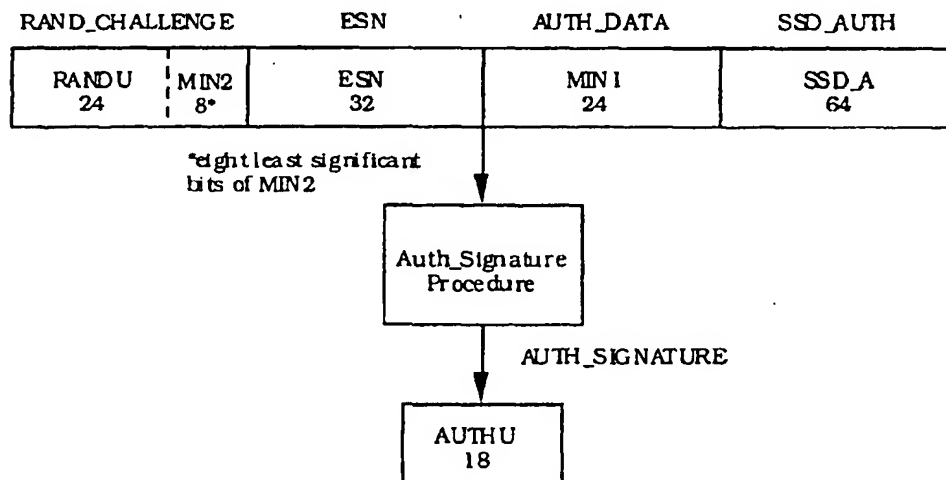
#### 2.3.12.1.5 Unique Challenge-Response Procedure

The Unique Challenge-Response Procedure is initiated by the base station and can be carried out over the control and/or analog voice channels.

More specifically:

- At the base station,
  - a 24-bit, random pattern referred to as RANDU is generated and sent to the mobile station via:
    - the FOCC in Word 3-Unique Challenge Order Word of a mobile station control message if the procedure is to be initiated on a forward control channel (see 3.6.2.3 and 3.7.1.1); or
    - the FVC in Word 2-Unique Challenge Order Word of a mobile station control message if the mobile station has been assigned to a voice channel (see 3.6.4 and 3.7.2.1).
  - set the input parameters of the Auth\_Signature procedure (see "Interface Specification for Common Cryptographic Algorithms," section 2.3) as illustrated in Figure 2.3.12.1.5-1. The 24 most significant bits of the RAND\_CHALLENGE input parameter shall be filled with RANDU, and the 8 least significant bits of RAND\_CHALLENGE shall be filled with the 8 least significant bits of MIN2;
  - set the SAVE\_REGISTERS input parameter to FALSE;
  - execute the Auth\_Signature procedure;

- 1           • set AUTHU equal to the 18-bit output AUTH\_SIGNATURE.
- 2       • At the mobile station,
- 3           • compute AUTHU as described above using the received RANDU and its
- 4           internally stored values for the remaining input parameters;
- 5           • send AUTHU to the base station via:
- 6           • the RECC in WORD C-Unique Challenge Order Confirmation Word of an
- 7           order confirmation message if the mobile station is not tuned to a voice
- 8           channel (see 2.6.2.3 and 2.7.1.1); or
- 9           • the RVC in a Unique Challenge Order Confirmation message if the mobile
- 10          station is tuned to an analog voice channel (see 2.6.4 and 2.7.2.1).
- 11 Upon receipt of the Unique Challenge Order Confirmation from the mobile station, the base
- 12 station compares the received value for AUTHU to that generated/stored internally. If the
- 13 comparison fails, the base station may deny further access attempts by the mobile station,
- 14 drop the call in progress, or initiate the process of updating the SSD (see 2.3.12.1.8).



1    2.3.12.1.6 Authentication of Mobile Station Originations

2    When the information element AUTH in the System Parameter Overhead Message is set to  
 3    1, and the mobile station attempts to originate a call, the following authentication-related  
 4    procedures shall be performed:

- 5        • In the mobile station,
- 6            • set the input parameters of the Auth\_Signature procedure (see "Interface  
 7            Specification for Common Cryptographic Algorithms," section 2.3) as  
 8            illustrated in Figure 2.3.12.1.6-1. The AUTH\_DATA input parameter shall  
 9            contain the last six digits transmitted by the mobile station.

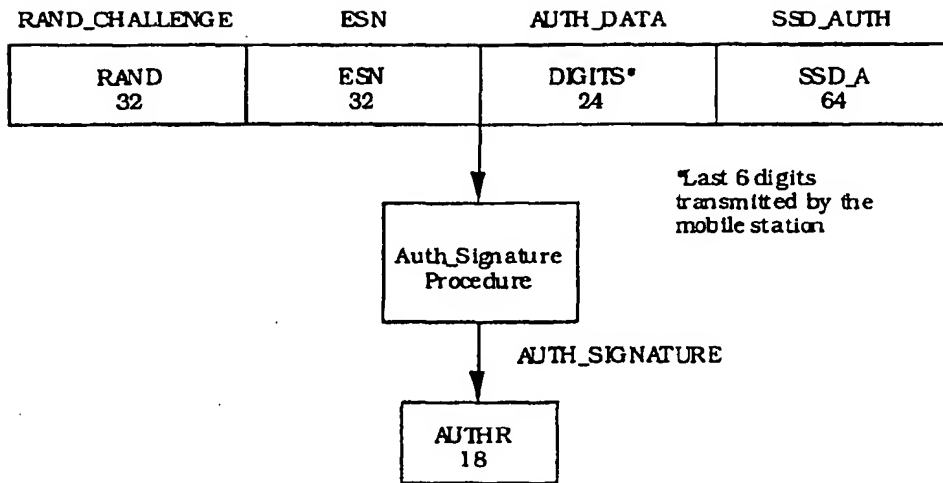
10            The exact procedure is that MIN1 is used to initially fill the AUTH\_DATA  
 11            input parameter and then the last dialed digits entered by the subscriber are  
 12            used to replace all or part of this initial value. If a full 6 digits are dialed, the  
 13            first digit of the 6 that was dialed is used as the most significant 4 bits of  
 14            AUTH\_DATA, the second digit is the next less-significant 4 bits of  
 15            AUTH\_DATA, and so forth. If less than 6 digits are dialed, then the least  
 16            significant 4 bits of AUTH\_DATA are the last dialed digit, the second-last  
 17            dialed digit becomes the next more-significant 4 bits of AUTH\_DATA, and so  
 18            on up to the first of the dialed digits;

- 19            • set the SAVE\_REGISTERS input parameter to TRUE;
- 20            • execute the Auth\_Signature procedure;
- 21            • set AUTHR equal to the 18-bit output AUTH\_SIGNATURE;
- 22            • send AUTHR together with RANDC (eight most significant bits of RAND) and  
 23            COUNT<sub>s-p</sub> to the base station (Authentication Word C of the RECC  
 24            Origination Message).

- 25        • At the base station,
- 26            • compare the received values for RANDC, and optionally COUNT, with the  
 27            internally stored values associated with the received MIN/ESN;
- 28            • compute AUTHR as described above, except use the internally stored value of  
 29            SSD\_A; and
- 30            • compare the value for AUTHR computed internally with the value of AUTHR  
 31            received from the mobile station.

32    If the comparisons at the base station are successful, the appropriate channel assignment  
 33    procedures are commenced. Once assigned to an analog voice channel, the base station  
 34    may, at the discretion of the system operator, issue a Parameter Update Order (see Table  
 35    3.7.1.1-1) to the mobile station on the FVC. Mobile stations confirm the receipt of  
 36    Parameter Update Orders by sending Parameter Update Confirmations on the RVC.

37    If any of the comparisons by the base station fail, the base station may deny service, initiate  
 38    the Unique Challenge-Response procedure (see 2.3.12.1.5), or commence the process of  
 39    updating the SSD (see 2.3.12.1.8).



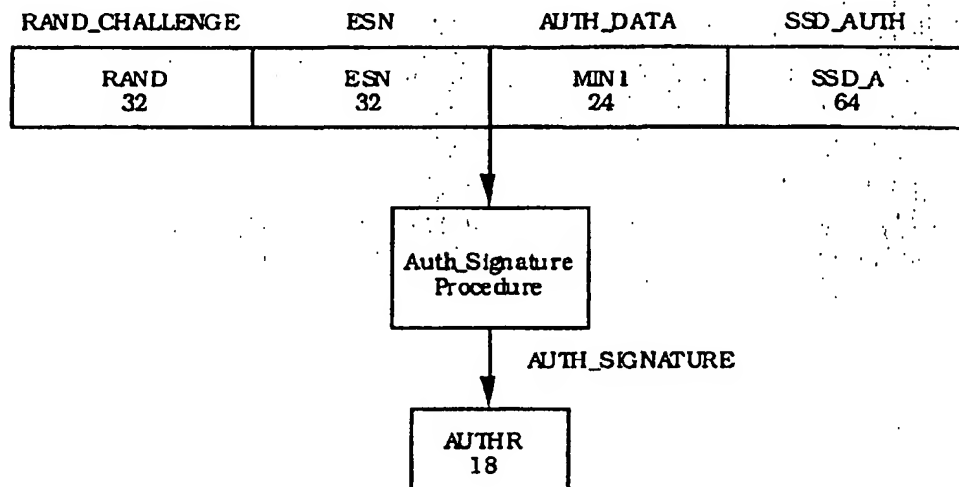
**Figure 2.3.12.1.6-1. Computation of AUTHR for Authentication of Mobile Station Originations**

#### 2.3.12.1.7 Authentication of Mobile Station Terminations

When the information element AUTH in the System Parameter Overhead Message is set to 1, and a "Page Match" occurs, the following authentication-related procedures shall be performed:

- In the mobile station,
  - set the input parameters of the Auth\_Signature procedure (see "Interface Specification for Common Cryptographic Algorithms," section 2.3) as illustrated in Figure 2.3.12.1.7-1;
  - set the SAVE\_REGISTERS input parameter to TRUE;
  - execute the Auth\_Signature procedure;
  - set AUTHR equal to the 18-bit output AUTH\_SIGNATURE;
  - send AUTHR together with RANDC (eight most significant bits of RAND) and COUNT<sub>s-p</sub> to the base station (Authentication Word C of the RECC Page Response Message).
- At the base station,
  - compare the received values for RANDC, and optionally COUNT, with the internally stored values associated with the received MIN/ESN;
  - compute AUTHR as described above, except use the internally stored value of SSD\_A; and
  - compare the value for AUTHR computed internally with the value of AUTHR received from the mobile station.

1 If the comparisons at the base station are successful, the appropriate channel assignment  
 2 procedures are commenced. Once assigned to an analog voice channel, the base station  
 3 may, at the discretion of the system operator, issue a Parameter Update Order (see Table  
 4 3.7.1.1-1) to the mobile station on the FVC. Mobile stations confirm the receipt of  
 5 Parameter Update Orders by sending Parameter Update Confirmations on the RVC.



7  
 8 **Figure 2.3.12.1.7-1. Computation of AUTHR for Authentication of Mobile**  
 9 **Station Terminations**

10  
 11 If any of the comparisons by the base station fail, the base station may deny service, initiate  
 12 the Unique Challenge procedure (see 2.3.12.1.5), or commence the process of updating the  
 13 SSD (see 2.3.12.1.8).

14 **2.3.12.1.8 Updating the Shared Secret Data (SSD)**

15 Updating the SSD involves the SSD\_Generation procedure (see "Interface Specification for  
 16 Common Cryptographic Algorithms," section 2.2.1), initialized with mobile station specific  
 17 information, random data and the mobile station's A-key.

18 The A-key is:

- 19 • 64 bits long;
- 20 • assigned to the mobile station;
- 21 • stored in the mobile station's permanent security and identification memory; and
- 22 • is known only to the mobile station and its associated Home Location  
 23 Register/Authentication Center (HLR/AC).



**Notes**

1. The A-key is only known to the mobile station and its associated HLR/AC, to enhance the security of the mobile station's secret data by eliminating the need to pass the A-key itself from system to system as the subscriber roams. As a consequence, SSD updates are carried out only in the mobile station and its associated HLR/AC, not in the serving system. The serving system obtains a copy of the SSD computed by the HLR/AC via intersystem communication (see EIA/TIA IS-41) with the mobile station's HLR/AC.

2. Since the SSD Update procedure involves multiple transactions and can be started on one channel and completed on another channel, call processing and signaling text above and beyond that normally included in this portion of the document has been included here for the sake of added clarity.

An A-key must be entered into the mobile station. See "User Interface for Authentication Key Entry," TSB50, for details.

More specifically, updating the SSD in the mobile station proceeds as follows (see Figure 2.3.12.1.8-1):

- At the base station,
  - send an SSD Update Order, with the RANDSSD field set to the same 56-bit random number used in the HLR/AC computations, to the mobile station on the:
    - FOCC in Word 3-First SSD Update Order Word, Word 4-Second SSD Update Order Word and Word 5-Third SSD Update Order Word of a mobile station control message if the mobile station has not been assigned to an analog voice channel (see 3.6.2.3 and 3.7.1.1); or
    - FVC in Word 2-First SSD Update Order Word, Word 3-Second SSD Update Order Word and Word 4-Third SSD Update Order Word of a mobile station control message if the mobile station has been assigned to an analog voice channel (see 3.6.4 and 3.7.2.1).
- In the mobile station,
  - upon receipt of the SSD Update Order, set the input parameters of the SSD\_Generation procedure (see "Interface Specification for Common Cryptographic Algorithms," section 2.2.1) as illustrated in Figure 2.3.12.1.8-2;
  - execute the SSD\_Generation procedure;
  - set SSD\_A\_NEW and SSD\_B\_NEW to the outputs of the SSD\_Generation procedure;
  - select a 32-bit random number, RANDBS, and send it to the base station in a Base Station Challenge Order on the:
    - RECC in Word C-Base Station Challenge Word if the mobile station is not tuned to an analog voice channel (see 2.6.2.3 and 2.7.1.1); or

- 1                   • RVC in Words 1 and 2 of a Base Station Challenge Order message if the
- 2                   mobile station is tuned to an analog voice channel (see 2.6.4 and
- 3                   2.7.2.1).
- 4                   • set the input parameters of the Auth\_Signature procedure (see "Interface
- 5                   Specification for Common Cryptographic Algorithms," section 2.3) as
- 6                   illustrated in Figure 2.3.12.1.8-3;
- 7                   • set the SAVE\_REGISTERS input parameter to FALSE;
- 8                   • execute the Auth\_Signature procedure;
- 9                   • set AUTHBS equal to the 18-bit output AUTH\_SIGNATURE.

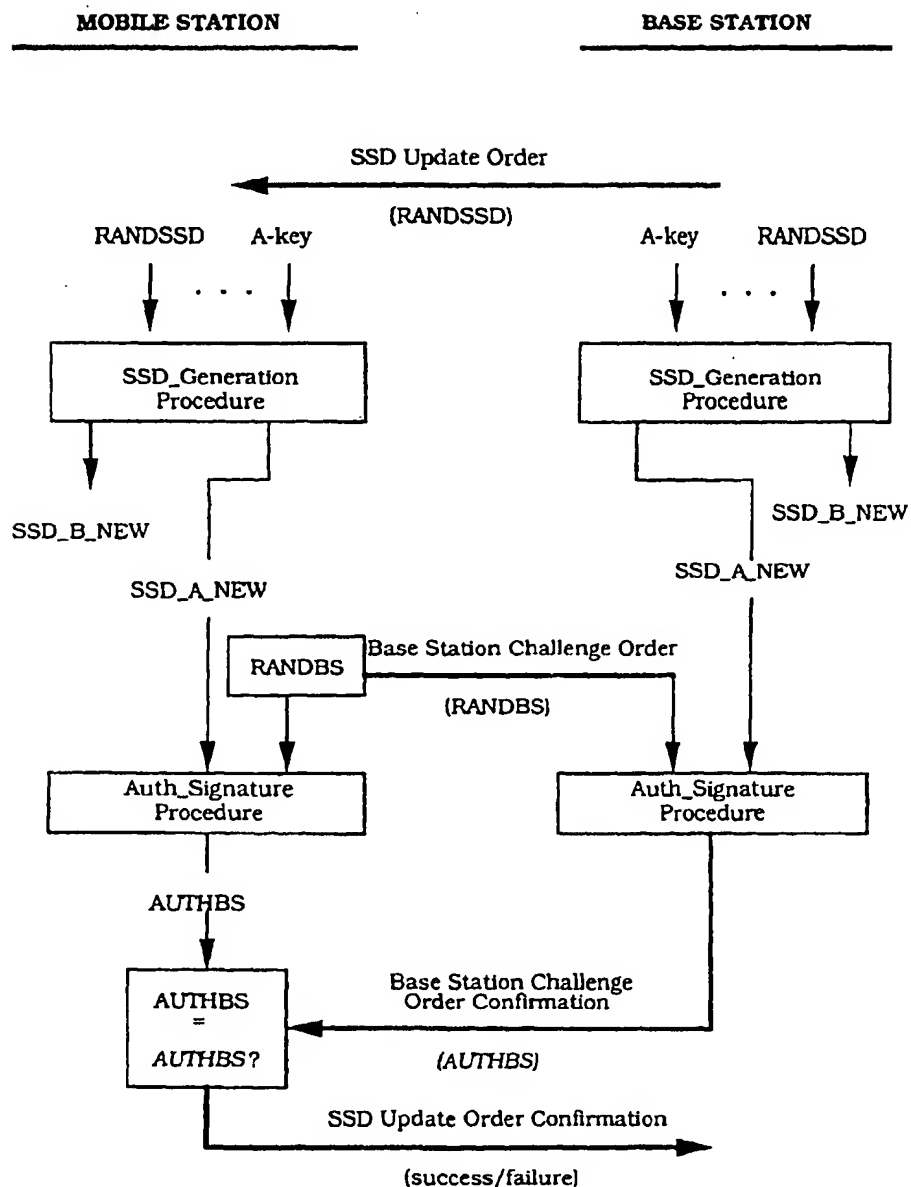


Figure 2.3.12.1.8-1. SSD Update Message Flow

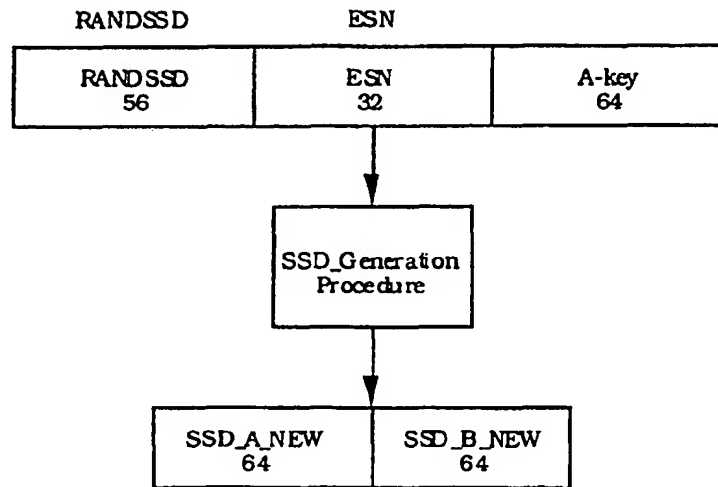


Figure 2.3.12.1.8-2. Computation of Shared Secret Data (SSD)

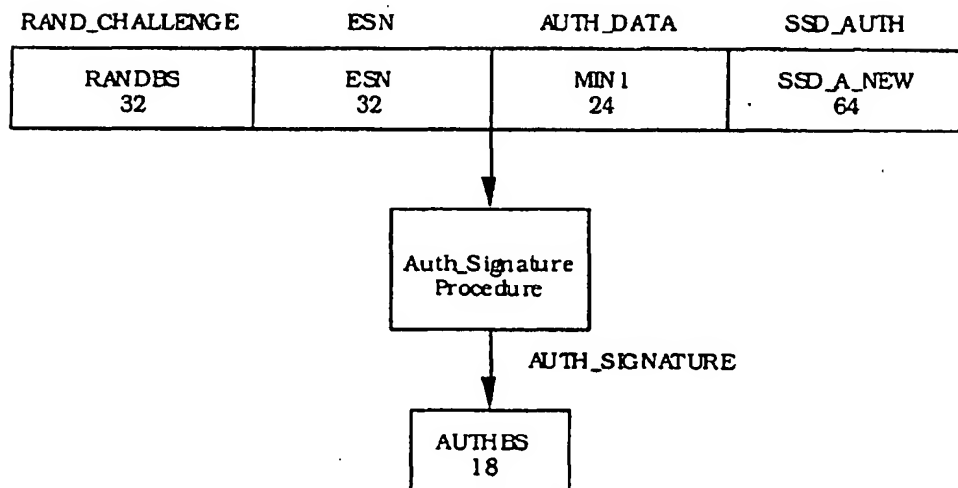


Figure 2.3.12.1.8-3. Computation of AUTHES

- 1     • In the base station,
  - 2         • upon receipt of the Base Station Challenge Order, set the input parameters of
  - 3         the Auth\_Signature procedure (see "Interface Specification for Common
  - 4         Cryptographic Algorithms," section 2.3) as illustrated in Figure 2.3.12.1.8-3,
  - 5         where RANDBS is set to the value received in the Base Station Challenge Order;
  - 6         • set the SAVE\_REGISTERS input parameter to FALSE;
  - 7         • execute the Auth\_Signature procedure;
    - 8             • set AUTHBS equal to the 18-bit output AUTH\_SIGNATURE;
    - 9             • acknowledge receipt of the Base Station Challenge Order by including
    - 10            AUTHBS in the Base Station Challenge Order Confirmation message,
    - 11            which is sent on the:
      - 12               • FOCC in Word 3-Base Station Challenge Order Confirmation Word of
      - 13               a mobile station control message if the mobile station has not yet
      - 14               been assigned to an analog voice channel (see 3.6.2.3, 3.6.3.3 and
      - 15               3.7.1.1); or
      - 16               • FVC in Word 2-Base Station Challenge Order Confirmation of a
      - 17               mobile station control message if the mobile station has been
      - 18               assigned to an analog voice channel (see 3.6.4 and 3.7.2.1).
- 19     • In the mobile station,
  - 20         • upon receipt of the Base Station Challenge Order Confirmation, compare the
  - 21         AUTHBS received to that generated internally;
  - 22         • acknowledge receipt of the SSD Update Order as follows:
    - 23             • if the comparison at the mobile station is successful, execute the
    - 24             SSD\_Update procedure (see "Interface Specification for Common
    - 25             Cryptographic Algorithms," section 2.2.2) to set SSD\_A and SSD\_B to
    - 26             SSD\_A\_NEW and SSD\_B\_NEW, respectively, and:
    - 27             • if the mobile station is not tuned to an analog voice channel
      - 28                 • send an order confirmation message to the base station on the RECC
      - 29                 with:
        - 30                     • the "T" field in Word A-Abbreviated Address Word set to '0' to
        - 31                     identify the message as an Order Confirmation;
        - 32                     • the "ORDER" field in Word B-Extended Address Word set to
        - 33                     '10101' to signify confirmation of the SSD Update Order;
        - 34                     • the "ORDQ" field in Word B-Extended Address Word set to '001'
        - 35                     to denote the successful completion of the SSD Update process;
        - 36                     and
        - 37                     • all other fields set as described in 2.7.1.1 and in the references
        - 38                     cited therein.

- 1                   • if the mobile station is tuned to an analog voice channel,
- 2                   • send an Order Confirmation message to the base station on the RVC
- 3                   with:
- 4                   • the "T" field set to '1' to identify the message as an order
- 5                   confirmation;
- 6                   • the "ORDER" field set to '10101' to signify confirmation of the
- 7                   SSD Update order;
- 8                   • the "ORDQ" field set to '001' to denote the successful completion
- 9                   of the SSD Update process; and
- 10                  • all other fields set as described in 2.7.2.1 and in the references
- 11                  cited therein.
- 12                  • if the comparison at the mobile station fails, discard SSD\_A\_NEW and
- 13                  SSD-B\_NEW, and:
- 14                  • if the mobile station is not tuned to an analog voice channel,
- 15                  • send an order confirmation message to the base station on the RECC
- 16                  with:
- 17                  • the "T" field in Word A-Abbreviated Address Word set to '0' to
- 18                  identify the message as an Order Confirmation;
- 19                  • the "ORDER" field in Word B-Extended Address Word set to
- 20                  '10101' to signify confirmation of the SSD Update Order;
- 21                  • the "ORDQ" field in Word B-Extended Address Word set to '000'
- 22                  to denote the unsuccessful completion of the SSD Update
- 23                  process; and
- 24                  • all other fields set as described in 2.7.1.1 and in the references
- 25                  cited therein.
- 26                  • if the mobile station is tuned to an analog voice channel,
- 27                  • send an Order Confirmation message to the base station on the RVC
- 28                  with:
- 29                  • the "T" field set to '1' to identify the message as an order
- 30                  confirmation;
- 31                  • the "ORDER" field set to '10101' to signify confirmation of the
- 32                  SSD Update order;
- 33                  • the "ORDQ" field set to '000' to denote the unsuccessful
- 34                  completion of the SSD Update process; and
- 35                  • all other fields set as described in 2.7.2.1 and in the references
- 36                  cited therein.

1 In the base station, if the SSD Update Confirmation received from the mobile station  
2 indicates a success, set SSD\_A and SSD\_B to the values received from the HLR/AC (see  
3 EIA/TIA IS-41).

#### 4 2.3.12.1.9 Authentication Procedures

5 The availability of authentication algorithm information is governed under the U.S.  
6 International Traffic and Arms Regulation (ITAR) and the Export Administration  
7 Regulations. TIA will act as the focal point and facilitator for making such information  
8 available. Procedures for distribution of this information will be contained in the  
9 Technology Transfer Control Plan which applies to "Common Cryptographic Algorithms."  
10 The Technology Transfer Control Plan will be available from TIA.

#### 11 2.3.12.2 Signaling Message Encryption

12 In an effort to enhance the authentication process, and to protect sensitive subscriber  
13 information (e.g., PINs), provisions have been made to allow for the encryption of a select  
14 subset of FVC and RVC signaling messages. For messages defined in this standard, see  
15 Appendix A for the list of messages and fields to be encrypted. For optional enhanced  
16 protocol messages and narrow analog mode messages, see Appendix A of TIA/EIA/IS-91 for  
17 the list of messages and fields to be encrypted.

18 Consult "Interface Specification for Common Cryptographic Algorithms," section 2.5 for a  
19 description of how the algorithm is initialized and applied.

#### 20 2.3.12.2.1 Signaling Message Encryption Control

21 Signaling message encryption is controlled on a per-call basis. The default value is "off."  
22 To activate signaling message encryption for a mobile station assigned to an analog voice  
23 channel, the base station must send a Message Encryption Mode Order with the Order  
24 Qualifier field set to '001'. Signaling message encryption can also be activated during  
25 CDMA to analog handoff by the base station sending an *Analog Handoff Direction Message*  
26 with the MEM field set equal to '1'.

27 The data used to initialize the algorithm is computed based on parameters in effect at the  
28 time the AUTHR appended to the origination/page response message was computed (see  
29 2.3.12.1.6 and 2.3.12.1.7). For a call initiated via the CDMA Access Channel, the data  
30 used to initialize the algorithm is computed based on parameters in effect at the time the  
31 AUTHR appended to the *Origination Message* or *Page Response Message* was computed (see  
32 6.3.12.1.6 and 6.3.12.1.7).

33 Once activated, signaling message encryption can be deactivated by the base station by  
34 sending a Message Encryption Mode Order with the Order Qualifier field set to '000'.

35 In all cases both the base station and mobile station shall continue to operate in their  
36 present mode until the message sent to the mobile station has been properly acknowledged.

## 2.4 Supervision

### 2.4.1 Supervisory Audio Tone

The supervisory audio tone (SAT) will be one of three frequencies: 5970, 6000, or 6030 Hz. The SAT is added to the voice transmission by a base station (see 3.4.1). A mobile station must detect, filter, and modulate the transmitted voice channel carrier with this tone. Transmission of the SAT by a mobile station must be suspended during transmission of wideband data on the reverse voice channel (see 2.7.2), but must not be suspended when signaling tone is sent (see 2.4.2).

While a valid SAT is detected and the measured SAT determination does not agree with the SAT color code (SCC<sub>r</sub>) received in the Mobile Station Control Message (see 3.7.1.1 and 3.7.2), the receiver audio must be muted.

#### 2.4.1.1 SAT Detection

A mobile station must make the following decisions to determine which SAT, if any, is present:

Measured Frequency of Incoming Signal	Measured SAT Determination	Where
$f \leq f_1$	No valid SAT	$f_1 = 5955 \pm 5\text{Hz}$
$f_1 \leq f < f_2$	SAT = 5970	$f_2 = 5985 \pm 5\text{Hz}$
$f_2 \leq f < f_3$	SAT = 6000	$f_3 = 6015 \pm 5\text{Hz}$
$f_3 \leq f < f_4$	SAT = 6030	$f_4 = 6045 \pm 5 \text{ Hz}$
$f_4 \leq f$	No valid SAT	
No SAT Received	No valid SAT	

The determination of SAT is not required to be made continuously but should be performed at least every 250 ms.



#### 2.4.1.2 SAT Transmission

The transmission requirements for the SAT signal, including time delays in the transmitter, receiver, and any equalization circuits, are summarized as follows:

Condition	Requirement
Steady-state phase difference between received and transmitted SAT at 5970, 6000, and 6030 Hz	May have any average phase but must remain within a $\pm 10^\circ$ band
Phase Step Response	Settle to within $10^\circ$ of final steady state phase difference in $\leq 250$ ms
Tone Modulation Index	$1/3$ radian $\pm 10\%$ ( $\Delta f = \pm 2$ kHz)

#### 2.4.1.3 Fade Timing Status

When an SAT determination is made a mobile station must perform the following:

- If no valid SAT is detected or the measured SAT determination does not agree with the SAT color code (SCC<sub>r</sub>) received in the mobile station control message (see 3.7.1.1 and 3.7.2), the fade timing status must be enabled (see 2.6.4.1).
- Otherwise, the fade timing status must be disabled (see 2.6.4.1).

#### 2.4.2 Signaling Tone

Signaling tone must be 10 kHz  $\pm 1$  Hz and produce a nominal frequency deviation of  $\pm 8$  kHz.

### 2.5 Malfunction Detection

#### 2.5.1 Malfunction Timer

A timer separate from and independent of all other functions must be running continuously whenever power is applied to the transmitter of a mobile station. If the mobile station is software-controlled, sufficient reset commands must be interspersed throughout the mobile station logic program to ensure that the timer never expires as long as the proper sequence of operations is taking place; similar means must be provided, as appropriate, in hardware-controlled designs. If the timer expires, a malfunction must be assumed and the mobile station must be inhibited from transmitting. The maximum time allowed for expiration of the timer is 60 seconds.

This supersedes the requirement for a transmitter carrier-on indicator.

#### 2.5.2 False Transmission

A protection circuit must be provided to minimize the possibility of false transmitter operation caused by component failure within the mobile station.

## 1    2.6 Call Processing

2    The following sections describe mobile station operation as controlled by a base station.  
 3    Frequent references are made to the corresponding sections in the base station section and  
 4    to the messages that flow between a base station and a mobile station. It is helpful to read  
 5    2.6 and 3.6 in parallel and examine the message formats in 2.7 and 3.7 at the same time.

6    When power is applied to a mobile station, it shall enter the *System Determination Substate*  
 7    of the *Mobile Station Initialization State* with a power-up indication (see 6.6.1.1).

### 8    2.6.1 Initialization

#### 9    2.6.1.1 Retrieve System Parameters

10   If the First-Idle ID status is enabled (see 6.6.1.1), the mobile station must:

- 11     • Set the Location-Registration ID status to enabled.
- 12     • Set the first-registration ID status to enabled.
- 13     • Set the first-location-area ID status to enabled.
- 14     • Set  $PUREG_S = 0$ ,  $PDREG_S = 0$ ,  $LREG_S = 0$ ,  $LRCC_S = 0$ ,  $SID_S = 0$  and  $SID_T = 0$ .

15   The mobile station must then set the serving-system status according to the following  
 16   algorithm:

- 17     • If  $SERVSYS_S = SYS\_A$ , set the serving-system status to enabled.
- 18     • If  $SERVSYS_S = SYS\_B$ , set the serving-system status to disabled.

19   The mobile station must then enter the Scan Dedicated Control Channels Task  
 20   (see 2.6.1.1.1).

#### 21   2.6.1.1.1 Scan Dedicated Control Channels

22   If  $SID_T$  is not equal to  $SID_S$ , the mobile station shall set registration increment ( $REGINCR_S$ )  
 23   to its default value of 450, set the first-registration ID status to enabled, set the first-  
 24   location-area ID status to enabled, set  $LRCC_S = 0$  and set  $RAND_S = 0$ .

25   If the serving-system status is enabled, a mobile station must:

- 26     • Set  $FIRSTCHD_S$  to the first dedicated control channel for System A  
 27     (834.990 MHz/879.990 MHz).
- 28     • Set  $LASTCHD_S = FIRSTCHD_S - 21 + 1$ .

29   If the serving-system status is disabled, a mobile station must:

- 30     • Set  $FIRSTCHD_S$  to the first dedicated control channel for System B  
 31     (835.020 MHz/880.020 MHz).
- 32     • Set  $LASTCHD_S = FIRSTCHD_S + 21 - 1$ .

33   The mobile station examines the signal strength on each of the channels  $FIRSTCHD_S$  TO  
 34    $LASTCHD_S$ .

1 The mobile station must then enter the Update Overhead Information Task (see 2.6.1.1.2).

## 2 2.6.1.1.2 Update Overhead Information

3 Overhead messages are sent in a group called an overhead message train (see 3.7.1.2). The  
4 mobile station must use the value given in the NAWC (number of additional words coming)  
5 field of the System Parameter Overhead Message in the train to determine that all messages  
6 of the train have been received. The END field must be used as a cross-check. For NAWC  
7 counting purposes, inserted control filler messages (see 3.7.1) must not be counted as part  
8 of the overhead message train.

9 If the mobile station receives a BCH-code-correct but unrecognizable System Parameter  
10 Overhead Message, the mobile station must count that message as part of the train for  
11 NAWC counting purposes, but must not attempt to execute the message.

12 The mobile station must tune to the strongest dedicated control channel and, within 3  
13 seconds, receive a System Parameter Overhead Message (see 3.7.1.2) and update the  
14 following numeric information:

- 15 • System identification ( $SID_S$ ). Set the 14 most significant bits of  $SID_S$  to the value of  
16 the  $SID_1$  field. Set the least significant bit of  $SID_S$  to '1' if the serving-system status  
17 is enabled; otherwise, set the bit to '0'.
- 18 • Number of paging channels ( $N_S$ ). Set  $N_S$  to 1 plus the value of the  $N - 1$  field.
- 19 • First paging channel ( $FIRSTCHP_S$ ). Set  $FIRSTCHP_S$  according to the following  
20 algorithm:
  - 21 - If  $SID_S = HOME\_SID_P$ ,  $FIRSTCHP_S = FIRSTCHP_P$
  - 22 - If  $SID_S \neq HOME\_SID_P$ ,  $FIRSTCHP_S = FIRSTCHD_S$
- 23 • Last paging channel ( $LASTCHP_S$ ). Set  $LASTCHP_S$  according to the following  
24 algorithm:
  - 25 - If the serving-system status is enabled,  $LASTCHP_S = FIRSTCHP_S - N_S + 1$ .
  - 26 - If the serving-system status is disabled,  $LASTCHP_S = FIRSTCHP_S + N_S - 1$ .

27 If  $REDIRECTION_S$  equals enabled, the  $EXPECTED\_SID$  field of  $REDIRECT\_REC_S$  is not  
28 equal to 0, and  $SID_S$  is not equal to  $EXPECTED\_SID$ , the mobile station must enter the  
29 *System Determination Substate* of the *Mobile Station Initialization State* with a wrong system  
30 indication (see 6.6.1.1). Otherwise, if  $SID_T$  is not equal to  $SID_S$ , the mobile station shall set  
31 registration increment ( $REGINCR_S$ ) to its default value of 450, set the first-registration ID  
32 status to enabled, set the first-location-area ID status to enabled, set  $LRCC_S = 0$  and set  
33  $RAND_S = 0$ .

34 The mobile station must then enter the Paging Channel Selection Task (see 2.6.1.2).

1 If the mobile station cannot complete this task on the strongest dedicated control channel,  
 2 it shall tune to the second strongest dedicated control channel and attempt to complete this  
 3 task within a second 3-second interval. If it cannot complete this task on either of the two  
 4 strongest control channels, the mobile station must enter the *System Determination*  
 5 *Substate* of the *Mobile Station Initialization State* with an acquisition failure indication (see  
 6 6.6.1.1).

#### 7 2.6.1.2 Paging Channel Selection

##### 8 2.6.1.2.1 Scan Paging Channels

9 The mobile station must examine the signal strength on each of channels FIRSTCHP<sub>s</sub> to  
 10 LASTCHP<sub>s</sub> (see 2.6.1.1.2).

11 The mobile station must then enter the Verify Overhead Information Task (see 2.6.1.2.2).

##### 12 2.6.1.2.2 Verify Overhead Information

13 The mobile station must set the Wait-for-Overhead-Message bit (WFOM<sub>s</sub>) to '0'; the mobile  
 14 station must then tune to the strongest paging channel and, within 3 seconds, receive an  
 15 overhead message train (see 3.7.1.2) and update the following:

- 16 • *System identification*: Set the 14 most significant bits of SID<sub>r</sub> to the value of the  
 17 SID<sub>1</sub> field. Set the least significant bit of SID<sub>r</sub> to '1' if the serving-system status is  
 18 enabled; otherwise, set the bit to '0'.
- 19 • *ROAM status*: The mobile station must compare the received system identification  
 20 (SID<sub>r</sub>) with the stored system identification (SID<sub>s</sub>). If SID<sub>r</sub> = SID<sub>s</sub>, the mobile station  
 21 must compare SID<sub>s</sub> with HOME\_SID<sub>p</sub>. If HOME\_SID<sub>p</sub> = SID<sub>s</sub>, the mobile station  
 22 must set the ROAM status to disabled. If HOME\_SID<sub>p</sub> ≠ SID<sub>s</sub>, the mobile station  
 23 must set the ROAM status to enabled. If SID<sub>r</sub> ≠ SID<sub>s</sub>, the mobile station must enter  
 24 the *System Determination Substate* of the *Mobile Station Initialization State* with a  
 25 new system indication (see 6.6.1.1).
- 26 • *Local control status*: If the local control option is enabled within the mobile station  
 27 (see 2.3.9) and the bits of the home system identification (HOME\_SID<sub>p</sub>) that  
 28 comprise the group identification match the corresponding bits of SID<sub>s</sub>, then the  
 29 local control status must be enabled. Otherwise, the local control status must be  
 30 disabled.

31 If the Initialization Task was entered with an origination or page response indication, the  
 32 mobile station must also update the following numeric values:

- 33 • *Serial number bit* (S<sub>s</sub>): Set S<sub>s</sub> to the value in the S field.
- 34 • *Registration bit* (R<sub>s</sub>): If the roam status is disabled, set R<sub>s</sub> to the value of the REGH  
 35 field; if the roam status is enabled, set R<sub>s</sub> to the value of the REGR field.
- 36 • *Extended address bit* (E<sub>s</sub>): Set E<sub>s</sub> to the value in the E field.
- 37 • *Authentication bit* (AUTH<sub>s</sub>): Set AUTH<sub>s</sub> to the value in the AUTH field.
- 38 • *Discontinuous transmission bit* (DTX<sub>s</sub>): Set DTX<sub>s</sub> to the value of the DTX field.

- 1 • *Number of paging channels ( $N_s$ ):* Set  $N_s$  to 1 plus the value of the N-1 field.
- 2 • *Read-control-filler bit ( $RCF_s$ ):* Set  $RCF_s$  to the value of the RCF field.
- 3 • *Combined paging/access bit ( $CPA_s$ ):* Set  $CPA_s$  to the value of the CPA field.
- 4 • *Number of access channels ( $CMAx_s$ ):* Set  $CMAx_s$  to 1 plus the value of the CMAX-1
- 5 field.
- 6 • Determine control channel boundaries for accessing the system ( $FIRSTCHA_s$  and
- 7  $LASTCHA_s$ ) by using the following algorithm:
- 8   - If the serving-system status is enabled,
- 9     + If  $CPA_s = 1$ , set  $FIRSTCHA_s$  to  $FIRSTCHP_s$  for System A.
- 10    + If  $CPA_s = 0$ , set  $FIRSTCHA_s$  to  $FIRSTCHP_s$  for System A minus  $N_s$ .
- 11    +  $LASTCHA_s = FIRSTCHA_s - CMAx_s + 1$ .
- 12   - If the serving-system status is disabled,
- 13     + If  $CPA_s = 1$ , set  $FIRSTCHA_s$  to  $FIRSTCHP_s$  for System B.
- 14    + If  $CPA_s = 0$ , set  $FIRSTCHA_s$  to  $FIRSTCHP_s$  for System B plus  $N_s$ .
- 15    +  $LASTCHA_s = FIRSTCHA_s + CMAx_s - 1$ .
- 16 If the Initialization Task was entered with an origination indication, the mobile station must
- 17 enter the System Access Task with an "origination" indication (see 2.6.3).
- 18 If the Initialization Task was entered with a page response indication, the mobile station
- 19 must enter the System Access Task with a "page response" indication (see 2.6.3).
- 20 If the Initialization Task was entered with a wait for page indication, the mobile station
- 21 must enter the Idle Task with a "wait for page" indication (see 2.6.2).
- 22 Otherwise, the mobile station must enter Idle at the Response to Overhead Information
- 23 Task (see 2.6.2.1).
- 24 If the mobile station cannot complete this task on the strongest paging channel, it may tune
- 25 to the second strongest paging channel and attempt to complete this task within a second
- 26 3-second interval. If it cannot complete this task on either of the two strongest control
- 27 channels, the mobile station must enter the *System Determination Substate* of the *Mobile*
- 28 *Station Initialization State* with an acquisition failure indication (see 6.6.1.1).

## 1 2.6.2 Idle

2 During the Idle Task, a mobile station must execute each of the following four (sub)tasks  
 3 (see 2.6.2.1, 2.6.2.2, 2.6.2.3, and 2.6.2.4) at least every 46.3 ms, the periodicity of word  
 4 blocks on the forward control channel. If the Idle Task was entered with a wait for page  
 5 indication, the mobile station must not enter the *System Determination Substate* of the  
 6 *Mobile Station Initialization State* (see 6.6.1.1) for at least 6 seconds after entering the Idle  
 7 Task. Otherwise, if the mobile station is not listening to a control channel of the preferred  
 8 system and REDIRECTION<sub>s</sub> equals disabled, it may exit this task and enter the *System*  
 9 *Determination Substate* of the *Mobile Station Initialization State* with a reselection indication  
 10 (see 6.6.1.1).

### 11 2.6.2.1 Response to Overhead Information

12 Whenever a mobile station receives an overhead message train (see 3.7.1.2), the mobile  
 13 station must update SID<sub>r</sub> (see 2.6.1.2.2) and then compare SID<sub>s</sub> with SID<sub>r</sub>. If SID<sub>s</sub> ≠ SID<sub>r</sub>,  
 14 the mobile station must exit the Idle Task and enter the *System Determination Substate* of  
 15 the *Mobile Station Initialization State* with a new system indication (see 6.6.1.1).

16 If SID<sub>s</sub> = SID<sub>r</sub>, the mobile station shall update the following numeric values using  
 17 information contained in the System Parameter Overhead Message:

- 18 • *Serial number bit* (S<sub>s</sub>): Set S<sub>s</sub> to the value in the S field.
- 19 • *Registration bit* (R<sub>s</sub>): If the roam status is disabled, set R<sub>s</sub> to the value of the REGH  
 20 field; if the roam status is enabled, set R<sub>s</sub> to the value of the REGR field.
- 21 • *Extended address bit* (E<sub>s</sub>): Set E<sub>s</sub> to the value in the E field.
- 22 • *Authentication bit* (AUTH<sub>s</sub>): Set AUTH<sub>s</sub> to the value in the AUTH field.
- 23 • *Discontinuous transmission bit* (DTX<sub>s</sub>): Set DTX<sub>s</sub> to the value of the DTX field.
- 24 • *Number of paging channels* (N<sub>s</sub>): Set N<sub>s</sub> to 1 plus the value of the N - 1 field.
- 25 • *Read-control-filler bit* (RCF<sub>s</sub>): Set RCF<sub>s</sub> to the value of the RCF field.
- 26 • *Combined paging/access bit* (CPA<sub>s</sub>): Set CPA<sub>s</sub> to the value of the CPA field.
- 27 • *Number of access channels* (CMAX<sub>s</sub>): Set CMAX<sub>s</sub> to 1 plus the value of the CMAX - 1  
 28 field.
- 29 • Determine control channel boundaries for accessing the system (FIRSTCHA<sub>s</sub> and  
 30 LASTCHA<sub>s</sub>) by using the following algorithm:
  - 31 - If the serving-system status is enabled,
    - 32 + If CPA<sub>s</sub> = 1, set FIRSTCHA<sub>s</sub> to FIRSTCHP<sub>s</sub> for System A.
    - 33 + If CPA<sub>s</sub> = 0, set FIRSTCHA<sub>s</sub> to FIRSTCHP<sub>s</sub> for System A minus N<sub>s</sub>.
    - 34 + LASTCHA<sub>s</sub> = FIRSTCHA<sub>s</sub> - CMAX<sub>s</sub> + 1.
  - 35 - If the serving-system status is disabled,
    - 36 + If CPA<sub>s</sub> = 1, set FIRSTCHA<sub>s</sub> to FIRSTCHP<sub>s</sub> for System B.
    - 37 + If CPA<sub>s</sub> = 0, set FIRSTCHA<sub>s</sub> to FIRSTCHP<sub>s</sub> for System B plus N<sub>s</sub>.

1                   +    $LASTCHA_s = FIRSTCHA_s + CMAX_s - 1$ .

2   If  $SID_s = SID_{s-p}$ ,  $PUREG_{s-p} = 1$  and the First-Idle ID status is enabled the mobile station  
3 shall initiate an autonomous registration by entering the System Access Task (see 2.6.3)  
4 with a "registration" indication.

5   The mobile station must then respond as indicated to each of the following messages, if  
6 received in the overhead message train. The order in which the mobile station must  
7 respond to the messages, if two or more are received, is given by their order in the following  
8 list:

- 9       1. *Local Control Messages:* If the local control status is enabled (see 2.6.1.2.2) the  
10       mobile station must respond to the Local Control Messages.
- 11      2. *New Access Channel Set Message:*
  - 12       • The mobile station must set  $FIRSTCHA_s$  to the value of the NEWACC field of the  
13       message.
  - 14       • The mobile station must set  $LASTCHA_s$  according to the following algorithm:
    - 15       – If the serving-system status is enabled,  $LASTCHA_s = NEWACC_r - CMAX_s + 1$ .
    - 16       – If the serving-system status is disabled,  $LASTCHA_s = NEWACC_r + CMAX_s -$   
17       1.
- 18      3. *Registration Increment Message:* The mobile station must set  $REGINCR_s$  to the  
19       value of the REGINCR field in the message.
- 20      4. *Location Area Message:* The mobile station must set  $PUREG_s$ ,  $PDREG_s$ ,  $LREG_s$  and  
21        $LOCAID_s$  to the values contained in the corresponding fields of the received message  
22       and then set  $PUREG_{s-p}$  equal to  $PUREG_s$ .
  - 23       • If this message is received while first-idle ID status is disabled, location-  
24       registration ID status is disabled, first-registration ID status is enabled, first-  
25       location-area ID status is enabled, and the mobile station is tuned to a control  
26       channel different from  $LRCC_s$ , then the mobile station shall set first-location-  
27       area ID status to disabled.
  - 28       • If  $PUREG_s = 1$  and the location-registration ID status is enabled the mobile  
29       station must set the first-registration ID status to enabled (see 2.6.1.1.2) and set  
30       first-location-area ID status to disabled (see 2.6.1.1.2). The mobile station must  
31       then initiate an autonomous registration by entering the System Access Task  
32       (see 2.6.3) with a "registration" indication.
  - 33       • If  $LOCAID_{s-p} \neq LOCAID_s$  and  $LREG_s = 1$  the mobile station must do the  
34       following:
    - 35       – if the first-location-area ID status is disabled the mobile station must set the  
36       first-registration ID status to enabled (see 2.6.1.1.2) and then initiate an  
37       autonomous registration by entering the System Access Task (2.6.3) with a  
38       "registration" indication.

- 1           - if the first-location-area ID status is enabled and  $PUREG_{s-p} = 1$ , the mobile  
2           station must set the first-location-area ID status to disabled (see 2.6.1.1.2)  
3           and then enter the Autonomous Registration Update Task (see 2.6.3.11),  
4           supplying a "success" indication.
- 5           - if the first-location-area ID status is enabled and  $PUREG_{s-p} = 0$ , the mobile  
6           station must set the first-location-area ID status to disabled (see 2.6.1.1.2)  
7           and then initiate an autonomous registration by entering the System Access  
8           Task (see 2.6.3) with a "registration" indication.
- 9           Otherwise, the mobile station shall set the first-location-area ID status to  
10          disabled (see 2.6.1.1.2).
- 11          • The mobile station shall continue to process messages in the overhead message  
12          train.
- 13   5. *Random Challenge A Message:* The mobile station must set the corresponding  
14   portion of its internal  $RAND1_s$  to the value of the  $RAND1_A$  field in the Global Action  
15   Message (see 2.3.12.1.2 for updating of  $RAND$ ).
- 16   6. *Random Challenge B Message:* The mobile station shall set the corresponding  
17   portion of its internal  $RAND1_s$  to the value of the  $RAND1_B$  field in the Global Action  
18   Message (see 2.3.12.1.2 for updating of  $RAND$ ).
- 19   7. *Registration ID Message:* The mobile station must perform the following:  
20    • If this message is received while first-idle ID status is disabled, location-  
21    registration ID status is disabled, first-registration ID status is enabled, first-  
22    location-area ID status is enabled, and the mobile station is tuned to a control  
23    channel different from  $LRCC_s$ , then the mobile station shall set first-registration  
24    ID status to disabled.
- 25    • The mobile station must set  $REGID_s$  to the value of the  $REGID$  field of the  
26    received message. If the first-registration ID status is enabled, the location-  
27    registration ID status is disabled, and  $SID_s = SID_{s-p}$ , the mobile station must do  
28    the following:  
29      - set the first-registration ID status to disabled (see 2.6.1.1.2).  
30      - if autonomous registration is enabled, the mobile station must enter the  
31      Autonomous Registration Update Task (see 2.6.3.11), supplying a "success"  
32      indication.  
33      - the mobile station shall continue to process information in the overhead  
34      message stream.
- 35    Otherwise, the mobile station shall set the first-registration ID status to disabled  
36    (see 2.6.1.1.2) and proceed as follows  
37    • If  $SID_s$  equals the  $SID_{s-p}$  value stored in the registration memory, the mobile  
38    station must perform the following:



- 1       - The mobile station must use the following (or an equivalent) algorithm to  
2       review the  $NXTREG_{s-p}$  associated with the  $SID_{s-p}$  to determine if  $REGID_s$   
3       has cycled through zero:  
4       + If  $NXTREG_{s-p}$  is greater than or equal to  $REGID_s + REGINCR_s + 5$ , then  
5        $NXTREG_{s-p}$  must be replaced by the greater of 0 or  $NXTREG_{s-p} - 2^{20}$ .  
6       + Otherwise do not change  $NXTREG_{s-p}$ .  
7       - The mobile station must then compare  $REGID_s$  with the  $NXTREG_{s-p}$   
8       associated with the  $SID_{s-p}$ .  
9       + If  $REGID_s$  is greater than or equal to  $NXTREG_{s-p}$  and autonomous  
10       registration is enabled, the mobile station must set the first-registration  
11       ID status to disabled (see 2.6.1.1.2) and then enter the System Access  
12       Task with a "registration" indication (see 2.6.3).  
13       + If  $REGID_s$  is greater than or equal to  $NXTREG_{s-p}$  and autonomous  
14       registration is not enabled, then set  $NXTREG_{s-p}$  equal to  $REGID_s$ .  
15       + Otherwise, the mobile station must ignore the message and continue to  
16       process messages in the overhead message train.  
17       • If  $SID_s$  is not equal to the  $SID_{s-p}$  value stored in the registration memory, the  
18       mobile station must perform the following:  
19       - If autonomous registration is enabled, the mobile station shall set the first-  
20       registration ID status to disabled (see 2.6.1.1.2). The mobile station shall  
21       then enter the System Access Task with a "registration" indication supplied  
22       (see 2.6.3).  
23       - Otherwise, the mobile station must ignore the message and continue to  
24       process messages in the overhead message train.  
25       8. *CDMA Capability Message:* If  $CDMA\_AVAIL$  equals '1',  $REDIRECTION_s$  equals  
26       disabled, and the preferred mode of operation is CDMA, the mobile station may exit  
27       this task and enter the *System Determination Substate* of the *Mobile Station*  
28       *Initialization State* with a CDMA available indication (see 6.6.1.1). If  $CDMA\_AVAIL$   
29       equals '1',  $REDIRECTION_s$  equals enabled, the  $IGNORE\_CDMA$  field of  
30        $REDIRECT\_REC_s$  equals '0', and the preferred mode of operation is CDMA, the  
31       mobile station may exit this task and enter the *System Determination Substate* of the  
32       *Mobile Station Initialization State* with a CDMA available indication (see 6.6.1.1).  
33       9. *Rescan Message:* The mobile station must immediately exit this task and enter the  
34       *System Determination Substate* of the *Mobile Station Initialization State* with a rescan  
35       indication (see 6.6.1.1).  
36       10. *Any Other Message:* Ignore message.

### 2.6.2.2 Page Match

The mobile station must monitor mobile station control messages for page messages (see 3.7.1.1).

- If the ROAM status is disabled, the mobile station must attempt to match  $MIN1_p$  to  $MIN1_r$  for one-word messages and both  $MIN1_p$  and  $MIN2_p$  to  $MIN1_r$  and  $MIN2_r$ , respectively, for two-word messages. All decoded MIN bits must match to cause the mobile station to respond to the message.
- If the ROAM Status is enabled, the mobile station must attempt to match both  $MIN1_p$  and  $MIN2_p$  to  $MIN1_r$  and  $MIN2_r$ , respectively. All decoded MIN bits must match to cause the mobile station to respond to the order.

When a match occurs, the mobile station must enter the System Access Task with a "page response" indication (see 2.6.3).

### 2.6.2.3 Order

The mobile station must monitor mobile station control messages for orders and must attempt to match both  $MIN1_p$  and  $MIN2_p$  to  $MIN1_r$  and  $MIN2_r$ , respectively. All decoded MIN bits must match to cause the mobile station to respond to the order. The responses to the following orders are:

- *Abbreviated Alert:* The mobile station must enter the System Access Task (see 2.6.3) with an "order confirmation" indication.
- *Audit order:* The mobile station must enter the System Access Task (see 2.6.3) with an "order confirmation" indication.
- *Local control order:* The action to be taken depends on the local control field.
- *SSD update order:* The mobile station computes SSD-A\_NEW and SSD-B\_NEW and selects a RANDBS as described in 2.3.12.1.8. The mobile station must then enter the System Access Task (see 2.6.3) with a "base station challenge" indication.
- *Unique challenge order:* The mobile station executes the Unique Challenge procedure as in 2.3.12.1.5. The mobile station must then enter the System Access Task (see 2.6.3) with an "order confirmation" indication.
- *Message waiting order:* If the mobile station is capable of performing Message Waiting Notification, the mobile station shall indicate the presence of messages waiting based on the information contained in the message type field of the Message Waiting order (i.e., 0 for clear or no messages, other non-zero values indicate the number of messages waiting). The mobile station then enters the System Access Task (see 2.6.3) with an "order confirmation" indication.
- *Any other order:* Ignore order.

### 2.6.2.4 Call Initiation

When the user initiates a call, the System Access Task (see 2.6.3) must be entered with an "origination" indication.

1    2.6.2.5 Reserved

2    2.6.2.6 Power Down

3    If the mobile station is intentionally removed from the air interface while in the Idle Task  
4    and  $PDREG_s = 1$  the mobile station must initiate an autonomous registration by entering  
5    the System Access Task (see 2.6.3) with a "power down registration" indication.

6    2.6.3 System Access

7    2.6.3.1 Set Access Parameters

8    If a mobile station power down occurs during a system access and  $PDREG_s = 1$  the mobile  
9    station must terminate its access procedures and initiate an autonomous registration by  
10   entering the System Access Task (see 2.6.3) with a "power down registration" indication.

11   When the System Access Task is started, a timer, called the access timer, must be set as  
12   follows:

- 13       • If this is an origination, to a maximum of 12 seconds.
- 14       • If this is a page response, to a maximum of 6 seconds.
- 15       • If this is an order response, to a maximum of 6 seconds.
- 16       • If this is a registration other than power down registration, to a maximum of 6  
17       seconds.
- 18       • If this is a power down registration, to a maximum of 3 seconds.
- 19       • If this is a Base Station Challenge, to a maximum of 12 seconds.

20   The mobile station must set the last-try code ( $LT_s$ ) to '0' and then enter the Scan Access  
21   Channels Task (see 2.6.3.2).

22   2.6.3.2 Scan Access Channels

23   The mobile station must examine the signal strength on each of the channels  $FIRSTCHA_s$  to  
24    $LASTCHA_s$  and choose up to two channels with the strongest signals. See 2.6.2.1 Response  
25   to Overhead Information Task for access channel set determination.

26   The mobile station must then tune to the strongest access channel and enter the Retrieve  
27   Access Attempts Parameters Task (see 2.6.3.3).

28   2.6.3.3 Retrieve Access Attempt Parameters

29   The mobile station must set the maximum-number-of-seizure-attempts allowed  
30   ( $MAXSZTR_{sl}$ ) to a maximum of 10, and the maximum-number-of-busy-occurrences  
31   ( $MAXBUSY_{sl}$ ) to a maximum of 10.

32   The mobile station must then initialize the following to zero:

- 33       • Number of busy occurrences ( $NBUSY_{sv}$ )
- 34       • Number of unsuccessful seizure attempts ( $NSZTR_{sv}$ )

- 1 The mobile station must then examine the read control-filler bit ( $RCF_S$ ).
- 2
  - 3 • If  $RCF_S = 0$ , the mobile station must then within 400 ms (+100 ms, -0 ms) set  $DCC_S$
  - 4 to the value in the DCC field of a received message, set  $SDCC1_S$  and  $SDCC2_S$  to 0,
  - 5 and set the power level ( $PL_S$ ) to 0.
  - 6 • If  $RCF_S = 1$ , the mobile station must then within 1000 ms (+100 ms, -0 ms) read a
  - 7 Control-Filler Message, set  $DCC_S$ ,  $WFOM_S$ ,  $SDCC1_S$  and  $SDCC2_S$  to the values in
  - 8 the DCC, WFOM, SDCC1 and SDCC2 fields of the message, respectively, and set  $PL_S$
  - 9 to the power level given by Table 2.1.2.2-1 for the value of the CMAC field of the
  - 10 message and the mobile station power class (see 2.1.2.2, 2.3.3, and 3.7.1.2.4).
- 11 If the DCC field or the Control-Filler Message is not received within the time allowed, then
- 12 the mobile station must examine the access timer. If the access timer has expired, the
- 13 mobile station must enter the Serving-System Determination Task (see 2.6.3.12). If the
- 14 access timer has not expired, the mobile station must enter the Alternate Access Channel
- 15 Task (see 2.6.3.13).
- 16 The mobile station must then set  $BIS_S$  to '1' and examine the  $WFOM_S$  bit.
- 17
  - 18 • If  $WFOM_S = 1$ , the mobile station must enter the Update Overhead Information Task
  - 19 (see 2.6.3.4).
  - 20 • If  $WFOM_S = 0$ , the mobile station must wait a random delay. Each time it waits a
  - 21 random delay, a random delay must be generated with the time uniformly
  - 22 distributed in the interval 0 to  $92 \pm 1$  ms and, if quantized, with granularity no more
  - 23 than 1 ms. The mobile station must then enter the Seize Reverse Control Channel
  - 24 Task (see 2.6.3.5).
- 25 2.6.3.4 Update Overhead Information
- 26 If this task is not completed within 1.5 seconds, the mobile station must exit this task and
- 27 enter the Serving-System Determination Task (see 2.6.3.12). If the Update Overhead
- 28 Information Task is completed, the mobile station must enter the Seize Reverse Control
- 29 Channel Task (see 2.6.3.5).
- 30 The mobile station must receive an overhead message train (see 3.7.1.2).
- 31 If the access is a registration, an origination, or a page response, the mobile station shall
- 32 perform the following:
- 33
  - 34 • Update System Identification ( $SID_T$ ). Set the 14 most significant bits of  $SID_T$  to the
  - 35 value of the  $SID1$  field. Set the least significant bit of  $SID_T$  to '1' if the serving-system
  - 36 status is enabled; otherwise, set the bit to '0'.
  - 37 • If the access is a registration, the mobile station must compare  $SID_T$  with  $SID_S$ . If
  - 38  $SID_T$  is not equal to  $SID_S$ , the mobile station must exit the Update Overhead
  - 39 Information Task and enter the Serving System Determination Task (see 2.6.3.12).
  - 40 Otherwise, the mobile station shall continue to process this task.
  - If this access is an origination or a page response, the mobile station must compare
  - $SID_T$  with  $SID_{S-p}$ . If  $SID_T$  does not equal  $SID_{S-p}$ , the mobile station must set  $RAND_S$
  - equal to zero.

1 The mobile station must act as indicated below in response to the following global action  
2 messages, if received in the message train:

- 3 • *Overload Control Message.*
  - 4 - If this access is an origination, the mobile station must examine the value of the  
5 overload class field (OLC) identified by ACCOLC<sub>p</sub>. If the identified OLC field is  
6 set to '0', the mobile station must exit this task and enter the Serving-System  
7 Determination Task (see 2.6.3.12); if the identified OLC field is set to '1', the  
8 mobile station must continue to respond to messages in the overhead message  
9 train.
  - 10 - Otherwise, the mobile station must continue to respond to messages in the  
11 overhead message train.
- 12 • *Access Type Parameters Message:* The busy-idle status bit (BIS<sub>s</sub>) must be set to the  
13 value of the BIS field of the received message.
- 14 • *Random Challenge A Message:* The mobile station must set the corresponding  
15 portion of its internal RAND1<sub>s</sub> to the value of the RAND1\_A field in the Global Action  
16 Message (see 2.3.12.1.2 for updating of RAND).
- 17 • *Random Challenge B Message:* The mobile station must set the corresponding  
18 portion of its internal RAND1<sub>s</sub> to the value of the RAND1\_B field in the Global Action  
19 Message (see 2.3.12.1.2 for updating of RAND).
- 20 • *Access Attempt Parameters Message:* The mobile station must update the following  
21 parameters:
  - 22 - If this access is a page response,
    - 23 + Maximum number of seizure tries allowed (MAXSZTR<sub>s1</sub>) must be set to the  
24 value of the MAXSZTR-PGR field of the received message.
    - 25 + Maximum number of busy occurrences allowed (MAXBUSY<sub>s1</sub>) must be set to  
26 the value of the MAXBUSY-PGR field of the received message.
  - 27 - Otherwise,
    - 28 + Maximum number of seizure tries allowed (MAXSZTR<sub>s1</sub>) must be set to the  
29 value of the MAXSZTR-OTHER field of the received message.
    - 30 + Maximum number of busy occurrences allowed (MAXBUSY<sub>s1</sub>) must be set to  
31 the value of the MAXBUSY-OTHER field of the received message.

32 If the access is a registration access, the mobile station must respond as indicated to the  
33 registration identification message, if received in the overhead message train:

- 34 • The mobile station must set REGID<sub>s</sub> to the value of the REGID field in the message.

35 After the overhead message train is received and processed as required above, the mobile  
36 station must wait a random time. Each time this task is executed, a different random delay  
37 must be generated, distributed uniformly in the interval 0 to 750 ms, and if quantized, with  
38 granularity no greater than 1 ms. At the end of the delay, the mobile station must enter the  
39 Seize Reverse Control Channel Task (see 2.6.3.5).

### 1 2.6.3.5 Seize Reverse Control Channel

2 The mobile station must read the busy-idle bits of the channel (see 3.7.1).

- 3 • If the channel is busy, the mobile station must increment  $NBUSY_{SV}$  by 1.
  - 4 – If  $NBUSY_{SV}$  exceeds  $MAXBUSY_{SI}$ , then the mobile station must exit this task and
  - 5 enter the Serving-System Determination Task (see 2.6.3.12).
  - 6 – If  $NBUSY_{SV}$  does not exceed  $MAXBUSY_{SI}$ , then the mobile station must exit this
  - 7 task and the Delay After Failure Task must be executed (see 2.6.3.6).
- 8 • If the channel is idle, then the mobile station must set  $NBUSY_{SV}$  to zero, turn on the
- 9 transmitter at the power level indicated by  $PL_S$  (see 2.6.3.3 and 2.1.2.2), wait the
- 10 proper delay (see 2.1.2.1) until the transmitter is within 3 dB of the required power
- 11 level, and then start to send the message to the base station (see 2.7.1).

12 If  $BIS_S = 0$ , then the mobile station must enter the Service Request Task (see 2.6.3.7); if  
 13  $BIS_S = 1$ , then upon starting to send the message, the mobile station must continuously  
 14 monitor the busy-idle bits of the channel.

- 15 • If the channel becomes busy before the first 56 bits of the message are sent, the
- 16 mobile station must immediately stop sending the message and turn off the
- 17 transmitter.
- 18 • If the channel fails to change to busy by the time the mobile station has sent 104
- 19 bits, then the mobile station must immediately stop sending the message and turn
- 20 off the transmitter.

21 In either of these cases, the mobile station must then increment the count of seizure  
 22 failures ( $NSZTR_{SV}$ ) by 1 and compare the result with the maximum number of seizure  
 23 attempts allowed ( $MAXSZTR_{SI}$ ).

- 24 – If  $NSZTR_{SV}$  exceeds  $MAXSZTR_{SI}$ , the mobile station must exit this task and enter
- 25 the Serving-System Determination Task (see 2.6.3.12).
- 26 – If  $NSZTR_{SV}$  does not exceed  $MAXSZTR_{SI}$ , the mobile station must exit this task
- 27 and enter the Delay After Failure Task (see 2.6.3.6).
- 28 • If the busy-idle status changes to busy after 56 bits and before 104 bits are sent,
- 29 then the mobile station must enter the Service Request Task (see 2.6.3.7).

### 30 2.6.3.6 Delay After Failure

31 The mobile station must examine the access timer. If the access timer has expired, the  
 32 mobile station must enter the Serving-System Determination Task (see 2.6.3.12). If the  
 33 access timer has not expired, the mobile station must wait a random time. Each time it  
 34 enters this task, it must generate a random time, uniformly distributed in the interval 0 to  
 35 200 ms, and if quantized, with granularity no greater than 1 ms. The mobile station must  
 then enter the Seize Reverse Control Channel Task (see 2.6.3.5).

### 2.6.3.7 Service Request

The mobile station must continue to send its message to the base station. The information that must be sent is as follows (with the formats given in 2.7.1):

- Word A must always be sent.
- If:
  - $E_s = 1$ , or
  - $LT_s = 1$ , or
  - $AUTH_s = 1$ , or
  - the ROAM status is enabled, or
  - the ROAM status is disabled and  $EX_p = 1$ , or
  - the access is an "order confirmation," or
  - the access is a "registration," or
  - the access is a "base station challenge," or
  - the mobile station was paged with a two-word Mobile Station Control Message, or
  - $RCF = 1$ ,

Word B must be sent.

- Word C must be sent as per the following table:

$S_s$ Bit	Type of System Access			
	Registration, Origination or Page Response where $AUTH_s = 0$	Registration, Origination or Page Response where $AUTH_s = 1$	Unique Challenge Order Confirmation	Base Station Challenge
0	Send no Word C	Send Authentication Word C	Send Unique Challenge Order Confirmation Word C	Send Base Station Challenge Word C
1	Send Serial Number Word C	Send Serial Number Word C and Authentication Word C	Send Serial Number Word C and Unique Challenge Order Confirmation Word C	Send Serial Number Word C and Base Station Challenge Word C

- If the access is an "origination," word D must be sent.
- If the access is an "origination" and 9 to 16 digits were dialed, word E must be sent.

- 1 When the mobile station has sent its complete message, it must continue to send  
 2 unmodulated carrier for a nominal duration of 25 ms and then turn off the transmitter.
- 3 The next task to be entered depends on the type of access by the mobile station:
- 4 • If the access is an order confirmation, the mobile station must enter the Serving-  
 5 System Determination Task (see 2.6.3.12).
  - 6 • If the access is an origination, the mobile station must enter the Await Message  
 7 Task (see 2.6.3.8).
  - 8 • If the access is a page response, the mobile station must enter the Await Message  
 9 Task (see 2.6.3.8).
  - 10 • If the access is a registration request other than a power down registration the  
 11 mobile station must enter the Await Registration Confirmation Task (see 2.6.3.9). If  
 12 the registration is a power down registration the mobile station shall power down.
  - 13 • If the access is a base station challenge, the mobile station must enter the Await  
 14 Message Task (see 2.6.3.8).

#### 15 2.6.3.8 Await Message

16 If this task is not completed within 10 seconds for a Base Station Challenge or within 5  
 17 seconds for all other messages and orders, the mobile station must exit this task and enter  
 18 the Serving System Determination Task (see 2.6.3.12).

19 The mobile station must monitor mobile station control messages (see 3.7.1.1). If the  
 20 mobile station sent Word B as part of the Service Request (see 2.6.3.7), then the mobile  
 21 station must attempt to match MIN1<sub>p</sub> and MIN2<sub>p</sub> to MIN1<sub>r</sub> and MIN2<sub>r</sub>, respectively;  
 22 otherwise, the mobile station must attempt to match only MIN1<sub>p</sub> to MIN1<sub>r</sub>.

23 The mobile station must respond as indicated to any of the following messages if all  
 24 decoded MIN bits match.

25 If the access is an origination or page response:

- 26 • *Initial Voice Channel Designation Message* (see 3.7.1.1): The mobile station must  
 27 update the parameters as set in the message, delete all entries from SID\_NID\_LIST<sub>s</sub>,  
 28 ZONE\_LIST<sub>s</sub>, SID\_NID\_LIST<sub>s-p</sub>, and ZONE\_LIST<sub>s-p</sub>, and set REGISTERED<sub>s</sub> to NO.  
 29 If R<sub>s</sub> = 1 the mobile station must enter the Autonomous Registration Update Task  
 30 (see 2.6.3.11), supplying a "success" indication. Then enter the Confirm Initial Voice  
 31 Channel Task (see 2.6.4.2).
- 32 • *Directed-Retry Message* (see 3.7.1.1): If the mobile station is equipped for directed  
 33 retry, it must respond to the Directed-Retry Message as follows:  
 34 If the mobile station encounters the start of a new message before it receives all four  
 35 words of the Directed-Retry Message, it must exit this task and enter the Serving-  
 36 System Determination Task (see 2.6.3.12).  
 37 The mobile station must set the last-try code (LT<sub>s</sub>) according to the ORDQ field of  
 38 the message:  
 39 - If ORDQ = '000', set LT<sub>s</sub> to '0'.



1        - If  $ORDQ = '001'$ , set  $LT_s$  to '1'.

2        The mobile station must then clear  $CCLIST_s$  and examine each  $CHANPOS$  field in  
3        Words 3 and 4 of the message. For each nonzero  $CHANPOS$  field, the mobile station  
4        must calculate a corresponding channel number according to the following  
5        algorithm:

- 6        • If  $LOCAL/MSG\_TYPE = '00000'$  and the serving-system status is enabled, subtract  
7         $CHANPOS$  from  $FIRSTCHA_s + 1$ .
- 8        • If  $LOCAL/MSG\_TYPE = '00000'$  and the serving-system status is disabled, add  
9         $CHANPOS$  to  $FIRSTCHA_s - 1$ .
- 10       • If  $LOCAL/MSG\_TYPE = '00001'$  and the serving-system status is enabled, set  
11        $FIRSTCHA_s$  to the first dedicated control channel for System A (834.990  
12       MHz/879.990 MHz) and subtract  $CHANPOS$  from  $FIRSTCHA_s + 1$ . The mobile must  
13       also set  $AUTH_s$  to '0'.
- 14       • If  $LOCAL/MSG\_TYPE = '00001'$  and the serving-system status is disabled, set  
15        $FIRSTCHA_s$  to the first dedicated control channel for System B (835.020  
16       MHz/880.020 MHz) and add  $CHANPOS$  to  $FIRSTCHA_s - 1$ . The mobile must also set  
17        $AUTH_s$  to '0'.
- 18       • If  $LOCAL/MSG\_TYPE = '00010'$  and the serving-system status is enabled, set  
19        $FIRSTCHA_s$  to the first dedicated control channel for System A (834.990  
20       MHz/879.990 MHz) and subtract  $CHANPOS$  from  $FIRSTCHA_s + 1$ . The mobile must  
21       also set  $AUTH_s$  to '1'.
- 22       • If  $LOCAL/MSG\_TYPE = '00010'$  and the serving-system status is disabled, set  
23        $FIRSTCHA_s$  to the first dedicated control channel for System B (835.020  
24       MHz/880.020 MHz) and add  $CHANPOS$  to  $FIRSTCHA_s - 1$ . The mobile must also set  
25        $AUTH_s$  to '1'.

26       The mobile station must then determine whether each channel number is within the  
27       set allocated to cellular systems, and if so, list the channel number in  $CCLIST_s$ .

28       After completing its response to the Directed-Retry Message, the mobile station  
29       must examine the access timer. If the access timer has expired, the mobile station  
30       must enter the Serving-System Determination Task (see 2.6.3.12). If the access  
31       timer has not expired, the mobile station must enter the Directed-Retry Task (see  
32       2.6.3.14).

33       If the access is an origination:

- 34       • *Intercept:* The mobile station must enter the Serving-System Determination Task  
35       (see 2.6.3.12).
- 36       • *Reorder:* The mobile station must enter the Serving-System Determination Task (see  
37       2.6.3.12).

38       If the access is a page response:

- 39       • *Release:* The mobile station must enter the Serving-System Determination Task (see  
40       2.6.3.12).

1 If the access is a Base Station Challenge:

- 2 • *Base Station Challenge Order Confirmation:* The mobile station compares the  
3 AUTHBS received in the Base Station Challenge Order Confirmation message to that  
4 computed internally. The mobile station must then acknowledge receipt of the SSD  
5 Update Order by the SSD Update Order Confirmation message with a success or  
6 failure indication as described in 2.3.12.1.8 by entering the System Access Task (see  
7 2.6.3) with an "order response" indication (see 2.6.3.1). If the mobile station fails to  
8 receive the Base Station Challenge Order Confirmation within 10 seconds of when  
9 the Base Station Challenge Order was transmitted, terminate the SSD update  
10 process.

11 If the access is an origination and the user terminates a call during this task, the  
12 termination status must be enabled so that the call can be released on a voice channel (see  
13 2.6.4.4) instead of on a control channel.

#### 14 2.6.3.9 Await Registration Confirmation

15 If this task is not completed within 5 seconds, the mobile station must exit this task and  
16 enter the Action on Registration Failure Task (see 2.6.3.10).

17 The mobile station must monitor mobile station control messages (see 3.7.1.1). If the  
18 mobile station sent Word B as part of the Service Request (see 2.6.3.7), then the mobile  
19 station must attempt to match  $MIN1_p$  and  $MIN2_p$  to  $MIN1_r$  and  $MIN2_r$ , respectively;  
20 otherwise, the mobile station must attempt to match only  $MIN1_p$  to  $MIN1_r$ .

21 The mobile station must respond as indicated to any of the following messages if all  
22 decoded MIN bits match:

- 23 • *Release Order* (see 3.7.1.1): The mobile station must exit this task and enter the  
24 Action on Registration Failure Task (see 2.6.3.10).
- 25 • *Order Confirmation* (see 3.7.1.1): The mobile station must delete all entries from  
26  $SID\_NID\_LIST_s$ ,  $ZONE\_LIST_s$ ,  $SID\_NID\_LIST_{s-p}$ , and  $ZONE\_LIST_{s-p}$  and set  
27  $REGISTERED_s$  to NO. If autonomous registration is enabled or  
28  $PUREG_{s-p} = 1$ , or  $LREG_s = 1$ , the mobile station must enter the Autonomous  
29 Registration Update Task (see 2.6.3.11), supplying a "success" indication; the mobile  
30 station must then enter the Serving-System Determination Task (see 2.6.3.12).  
31 Otherwise, the mobile station must enter the Serving-System Determination Task  
32 (see 2.6.3.12).

#### 33 2.6.3.10 Action on Registration Failure

34 If autonomous registration is enabled or  $PUREG_{s-p} = 1$  or  $LREG_s = 1$ , the mobile station  
35 must enter the Autonomous Registration Update Task (see 2.6.3.11), supplying a "failure"  
36 indication; the mobile station must then enter the Serving-System Determination Task (see  
37 2.6.3.12). Otherwise, the mobile station must enter the Serving-System Determination  
38 Task (see 2.6.3.12).

### 1 2.6.3.11 Autonomous Registration Update

2 If the first-location area ID status is enabled, the first-registration ID status is enabled, the  
3 first-idle ID status is enabled and if a "success" indication was supplied to this task, the  
4 mobile station must set the location-registration ID status to disabled.

5 If the first-location-area ID status is disabled and a "success" indication was supplied to  
6 this task, the mobile station must set  $LOCAID_{s-p}$  equal to  $LOCAID_s$  and must set location-  
7 registration ID status to disabled.

8 If the first-registration ID status is disabled and a "success" indication was supplied to this  
9 task, the mobile station must set  $SID_{s-p}$  equal to  $SID_s$ , set  $NXTREQ_{s-p}$  equal to  $REGID_s +$   
10  $REGINCR_s$  and set location-registration ID status to disabled.

11 If the first-registration ID status is disabled and a "failure" indication was supplied to this  
12 task, the mobile station must do the following:

- 13 • generate a random number ( $NRANDOM_{sv}$ ). Each time this step is executed, a  
14 random number must be generated, uniformly distributed in the interval 0 to 10,  
15 and with granularity no more than 1.
- 16 • set  $NXTREQ_{s-p}$  equal to  $REGID_s + NRANDOM_{sv}$ .

17 If a "success" indication was supplied to this task and  $CPA_s = 1$ , the mobile station must  
18 set  $LRCC_s$  equal to the current control channel.

19 The mobile station must set the first-idle ID status to disabled and then return to the  
20 invoking task.

### 21 2.6.3.12 Serving-System Determination

22 If this task is entered as a result of a power down registration attempt the mobile station  
23 must immediately power down. Otherwise, the mobile station shall proceed as follows:

- 24 • If  $REDIRECTION_s$  equals disabled, and either the preferred mode of operation is  
25 CDMA or the serving-system status does not correspond to the preferred system, the  
26 mobile station may enter the *System Determination Substate* of the *Mobile Station*  
27 *Initialization State* with a reselection indication (see 6.6.1.1); otherwise, it must enter  
28 the *Paging Channel Selection Task* (see 2.6.1.2).

### 29 2.6.3.13 Alternate Access Channel

30 If the mobile station is tuned to the strongest access channel, it may tune to the second  
31 strongest channel and then enter the *Retrieve Access Attempt Parameters Task* (see  
32 2.6.3.3). Otherwise, it must enter the *Serving-System Determination Task* (see 2.6.3.12).

### 33 2.6.3.14 Directed Retry

34 The mobile station must examine the signal strength on each of the channels listed in  
35  $CCLIST_s$  and choose up to two channels with the strongest signals. The mobile station  
36 must then tune to the strongest access channel and enter the *Retrieve Access Attempts*  
37 *Parameters Task* (see 2.6.3.3).

1   **2.6.4 Mobile Station Control on the Analog Voice Channel**

2   **2.6.4.1 Loss of Radio-Link Continuity**

3   While the mobile station is tuned to a voice channel, it must monitor the fade timing status  
4   (see 2.4.1.3). If the fade timing status is enabled, a fade timer must be started; each time  
5   the fade timing status is disabled, the timer must be reset. If the timer counts to 5  
6   seconds, the mobile station must turn off its transmitter and enter the Serving-System  
7   Determination Task (see 2.6.3.12).

8   **2.6.4.2 Confirm Initial Voice Channel**

9   Within 100 ms of the receipt of the Initial Voice Channel Designation Message (see 3.7.1.1),  
10   or Channel Assignment Message (see 7.7.2.3.2.8) containing ASSIGN\_MODE = '011' and  
11   AN\_CHAN\_TYPE = '00', the mobile station must determine whether the channel number is  
12   within the set allocated to cellular systems, and do the following:

- 13       • If it is within the allocated set, the mobile station must tune to the designated voice  
14       channel, turn on the transmitter at the power level indicated by the VMAC field of  
15       the Initial Voice Channel Designation Message (see 2.1.2.2 and 3.7.1.1), turn on the  
16       SAT transponder (see 2.4.1), and set the stored SAT Color Code (SCC<sub>s</sub>) to the value  
17       of the SCC field of the Initial Voice Channel Designation Message (see 3.7.1.1).  
18       Discontinuous transmission (see 2.3.1.1) is prohibited while the mobile station is in  
19       this task. That is, a mobile station capable of discontinuous-transmission operation  
20       must remain in the DTX-high state.
- 21       - If this is an origination access, the mobile station then must enter the  
22       Conversation Task (see 2.6.4.4).
- 23       - If this is a page response access, the mobile station then must enter the Waiting  
24       for Order Task (see 2.6.4.3.1).
- 25       • Otherwise, the mobile station must enter the Serving-System Determination Task  
26       (see 2.6.3.12).

### 2.6.4.3 Alerting

#### 2.6.4.3.1 Waiting for Order

Discontinuous transmission (see 2.3.11) is prohibited while the mobile station is in this task. That is, a mobile station capable of discontinuous-transmission operation must remain in the DTX-high state. When this task is entered, an order timer must be set to 10 seconds. The following may occur:

- If this task is entered as a result of receiving an *Analog Handoff Direction Message* (see 6.6.6.2.9), the mobile station must use the VMAC, ANALOG\_CHAN, and SCC values obtained from the *Analog Handoff Direction Message* to perform the following operations: adjust power level, tune to new channel, adjust to new SAT, and set  $SCC_s$  to the value of the SCC field of the message (see 2.4.1). The mobile station must then turn on the transmitter, and reset the fade timer. The mobile station must set the message encryption mode to that indicated by the MEM value obtained from the *Analog Handoff Direction Message*. The mobile station may compare the SID value obtained from the *Analog Handoff Direction Message* with HOME\_SID<sub>p</sub>. If  $SID_r = HOME\_SID_p$ , the mobile station may set the ROAM status to disabled. If  $SID_r \neq HOME\_SID_p$ , the mobile station may set the ROAM status to enabled. The mobile station must remain in the Waiting for Order Task.
- If the order timer expires the mobile station must turn off the transmitter; then the mobile station must enter the Serving-System Determination Task (see 2.6.3.12).
- The mobile station may receive a Base Station Challenge Order Confirmation as part of the SSD Update process (see 2.3.12.1.8). The mobile station must compare the AUTHBS received in the Base Station Challenge Order Confirmation message with that computed internally. Then, within 750 ms, the mobile station must begin transmitting an acknowledgement of the SSD Update Order with a success or failure indication as described in 2.3.12.1.8. Remain in the Waiting for Order task. If the mobile station fails to receive the Base Station Challenge Order Confirmation within 10 seconds of when the Base Station Challenge Order was transmitted, terminate the SSD update process. Reset the order timer to 10 seconds and remain in the Waiting for Order task.
- Within 100 ms of the receipt of any of the orders listed below (see 3.7.2), the mobile station must compare  $SCC_s$  to the present SAT color code (PSCC) field in the received message. If  $SCC_s \neq PSCC$ , the order must be ignored. If  $SCC_s = PSCC$ , the action to be taken for each order is as follows:
  - *Handoff (to Analog Voice Channel)*: Turn on signaling tone for 50 ms, turn off signaling tone, turn off transmitter, adjust power level, tune to new channel, adjust to new SAT, set  $SCC_s$  to the value of the SCC field of the message (see 2.4.1), turn on transmitter, reset fade timer, remain in the Waiting for Order Task, and reset the order timer to 10 seconds.
  - *Handoff (to Digital Traffic Channel)*: Requires further study.
  - *Alert or Alert With Info*: Turn on signaling tone, wait 500 ms, and enter the Waiting for Answer Task (see 2.6.4.3.2).

- Alert With Info SMS: Within 750 ms the mobile station must send an Alert With Info SMS Order Confirmation message. Remain in the Waiting for Order Task. If the value of the TASK\_TM field of the received message is '0', reset the order timer to 10 seconds; otherwise reset the order timer to 600 ms.

Process the Alert With Info SMS message as follows:

- If the value of the B/F field of the received message is '11', the INFO\_DATA field of the received message contains an unsegmented SMS teleservice message. The mobile station may discard any incomplete SMS teleservice message being reassembled, and should pass the INFO\_DATA field of the received message to the SMS teleservice. Set the B/F field of the Alert With Info SMS Order Confirmation Message to '1'. If the teleservice reports an error, set the ERROR\_CLASS and CAUSE\_CODE fields of the Alert With Info SMS Order Confirmation Message to report the teleservice error.
- If the value of the B/F field of the received message is '10', the mobile station may discard any incomplete SMS teleservice message being reassembled, and must store the INFO\_DATA field of the received message as the first segment of an SMS teleservice message being reassembled. Store the value of the SEQ\_NO field of the received message in SEQ\_NO<sub>s</sub>. Set the B/F field of the Alert With Info SMS Order Confirmation Message to '0'.
- If the value of the B/F field of the received message is '00' and a segmented SMS teleservice message is being reassembled, compare the value of the SEQ\_NO field of the received message to SEQ\_NO<sub>s</sub>. Set the B/F field of the Alert With Info SMS Order Confirmation Message to '0'. Take action as follows:
  - + If (SEQ\_NO<sub>s</sub> + 1) modulo 8 is equal to the value of the SEQ\_NO field of the received message, store the INFO\_DATA field of the received message as the next segment of the SMS teleservice message being reassembled, and increment SEQ\_NO<sub>s</sub> modulo 8.
  - + If SEQ\_NO<sub>s</sub> is equal to the value of the SEQ\_NO field of the received message, the mobile station may discard the INFO\_DATA field of the received message.
  - + If neither SEQ\_NO<sub>s</sub> nor (SEQ\_NO<sub>s</sub> + 1) modulo 8 is equal to the value of the SEQ\_NO field of the received message, the mobile station may discard the INFO\_DATA field of the received message and may discard the incomplete SMS teleservice message being reassembled.
- If the value of the B/F field of the received message is '00', and no segmented SMS teleservice message is being reassembled, the mobile station may discard the INFO\_DATA field of the received message. Set the B/F field of the Alert With Info SMS Order Confirmation Message to '0'.

- 1       • If the value of the B/F field of the received message is '01' and a segmented  
2       SMS teleservice message is being reassembled, store the INFO\_DATA field of  
3       the received message as the last segment of the SMS teleservice message and  
4       pass the complete SMS teleservice message to the SMS teleservice. Set the  
5       B/F field of the Alert With Info SMS Order Confirmation Message to '1'. If  
6       the teleservice reports an error, set the ERROR\_CLASS and CAUSE\_CODE  
7       fields of the Alert With Info SMS Order Confirmation Message to report the  
8       teleservice error.
- 9       • If the value of the B/F field of the received message is '01', and no segmented  
10       SMS teleservice message is being reassembled, the mobile station may  
11       discard the INFO\_DATA field of the received message. Set the  
12       ERROR\_CLASS and CAUSE\_CODE fields of the Alert With Info SMS Order  
13       Confirmation Message to report an error due to reception of an incomplete  
14       message. Set the B/F field of the Alert With Info SMS Order Confirmation  
15       Message to '0'.
- 16      - *Release:* Enter Release Task (see 2.6.4.5).
- 17      - *Audit:* Send order confirmation message to base station (see 2.7.2), remain in  
18       the Waiting for Order Task, and reset the order timer to 10 seconds.
- 19      - *Message Waiting Order:* If the mobile station is capable of performing Message  
20       Waiting Notification, the mobile station shall indicate the presence of messages  
21       waiting based on the information contained in the message type field of the  
22       Message Waiting order (i.e., 0 for clear or no messages, other non-zero values  
23       indicate the number of messages waiting). The mobile station must send an  
24       order confirmation to the base station (see 2.7.2), reset the order timer to 10  
25       seconds and remain in the Waiting for Order Task.
- 26      - *Maintenance:* Turn on signaling tone, wait 500 ms, and enter the Waiting for  
27       Answer Task (see 2.6.4.3.2).
- 28      - *Change Power:* Adjust the transmitter to the power level indicated by the order  
29       qualification code (see 3.7.1.1 and 2.1.2.2) and send order confirmation message  
30       to base station (see 2.7.2). Remain in the Waiting for Order Task, and reset the  
31       order timer to 10 seconds.
- 32      - *Local Control:* If the local control status is enabled (see 2.6.1.2.2) and a local  
33       control order is received, the local control field must be examined to determine  
34       the action and confirmation to take.
- 35      - *Page:* Reply with Page Response. The mobile station must remain in the  
36       Waiting for Order Task and reset the order timer to 10 seconds.
- 37      - *Serial Number Request:* Reply with Serial Number Response Message. The  
38       mobile station must remain in the Waiting for Order Task, and reset the order  
39       timer to 10 seconds.

- 1       - *SSD Update Order:* The mobile station computes SSD\_A\_NEW and SSD\_B\_NEW  
2       and selects a RANDBS as described in 2.3.12.1.8. Within 750 ms, the mobile  
3       station must reply with a Base Station Challenge Order. Remain in the Waiting  
4       for Order Task and reset the order timer to 10 seconds.
- 5       - *Unique Challenge Order:* The mobile station executes the Unique Challenge  
6       procedure as in 2.3.12.1.5. Within 750 ms, the mobile station must send an  
7       order confirmation message to the base station (see 2.7.2). Remain in the  
8       current task and reset the order timer to 10 seconds.
- 9       - *Message Encryption Mode Order:* The base station is activating/deactivating  
10      signaling message encryption. If the order qualifier field in the received message  
11      is set to '001', activate signaling message encryption. If the order qualifier field  
12      in the received message is set to '000', deactivate signaling message encryption.  
13      In either case, send an order confirmation message to the base station (see  
14      2.7.2), remain in the Waiting for Order Task and reset the order timer to 10  
15      seconds.
- 16      - *Parameter Update Order:* Increment COUNT<sub>s-p</sub> (see 2.3.12.1.3), send an order  
17      confirmation message to the base station (see 2.7.2) and reset the order timer to  
18      10 seconds. Remain in the Waiting for Order Task.
- 19      - *Any other order:* Ignore order.

#### 20   2.6.4.3.2 Waiting for Answer

21   Discontinuous transmission (see 2.3.11) is prohibited while the mobile station is in this  
22   task. That is, a mobile station capable of discontinuous-transmission operation must  
23   remain in the DTX-high state. When this task is entered, an alert timer must be set to 65  
24   seconds (-0, +20%). The following may occur:

- 25      • If this task is entered as a result of receiving an *Analog Handoff Direction Message*  
26      (see 6.6.6.2.9), the mobile station must use the VMAC, ANALOG\_CHAN, and SCC  
27      values obtained from the *Analog Handoff Direction Message* to perform the following  
28      operations: adjust power level, tune to new channel, adjust to new SAT, and set  
29      SCC<sub>s</sub> to the value of the SCC field of the message (see 2.4.1). The mobile station  
30      must then turn on the transmitter, reset the fade timer, and turn on the signaling  
31      tone. The mobile station must set the message encryption mode to that indicated  
32      by the MEM value obtained from the *Analog Handoff Direction Message*. The mobile  
33      station may compare the SID value obtained from the *Analog Handoff Direction*  
34      *Message* with HOME\_SID<sub>p</sub>. If SID<sub>r</sub> = HOME\_SID<sub>p</sub>, the mobile station may set the  
35      ROAM status to disabled. If SID<sub>r</sub> ≠ HOME\_SID<sub>p</sub>, the mobile station may set the  
36      ROAM status to enabled. The mobile station must remain in the Waiting for Answer  
37      Task.
- 38      • If the alert timer expires the mobile station must turn off the transmitter; then the  
39      mobile station must enter the Serving-System Determination Task (see 2.6.3.12).
- 40      • If the user answers, signaling tone must be turned off and the Conversation Task  
41      (see 2.6.4.4) must be entered.



- 1     • The mobile station may receive a Base Station Challenge Order Confirmation as part  
2       of the SSD Update process (see 2.3.12.1.8). The mobile station must compare the  
3       AUTHBS received in the Base Station Challenge Order Confirmation Message with  
4       that computed internally. Then, within 750 ms, the mobile station must begin  
5       transmitting an acknowledgement of the SSD Update Order with a success or failure  
6       indication as described in 2.3.12.1.8. Remain in the Waiting for Answer Task. If the  
7       mobile station fails to receive the Base Station Challenge Order Confirmation within  
8       10 seconds of when the Base Station Challenge Order was transmitted, terminate  
9       the SSD update process. The mobile station must remain in the Waiting for Answer  
10      Task.
- 11    • Within 100 ms of the receipt of any of the orders listed below, the mobile station  
12      must compare  $SCC_s$  to the PSCC field in the received message. If  $SCC_s \neq PSCC$ , the  
13      order must be ignored. If  $SCC_s = PSCC$ , the action to be taken for each order is as  
14      follows:
  - 15      – *Handoff (to Analog Voice Channel)*: Turn off signaling tone for 500 ms, turn on  
16        signaling tone for 50 ms, turn off signaling tone, turn off transmitter, adjust  
17        power level, tune to new channel, adjust to new SAT, set  $SCC_s$  to the value of  
18        the SCC field of the message (see 2.4.1), turn on transmitter, reset fade timer,  
19        and turn on signaling tone. Then remain in the Waiting for Answer Task.
  - 20      – *Handoff (to Digital Traffic Channel)*: Requires further study.
  - 21      – *Alert or Alert With Info*: Remain in the Waiting for Answer Task, and reset the  
22        alert timer to 65 seconds.
  - 23      – *Alert With Info SMS*: Within 750 ms the mobile station must send an Alert With  
24        Info SMS Order Confirmation message. Remain in the Waiting for Answer Task.
- 25      Process the Alert With Info SMS message as follows:
  - 26      • If the value of the B/F field of the received message is '11', the INFO\_DATA  
27        field of the received message contains an unsegmented SMS teleservice  
28        message. The mobile station may discard any incomplete SMS teleservice  
29        message being reassembled, and should pass the INFO\_DATA field of the  
30        received message to the SMS teleservice. Set the B/F field of the Alert With  
31        Info SMS Order Confirmation Message to '1'. If the teleservice reports an  
32        error, set the ERROR\_CLASS and CAUSE\_CODE fields of the Alert With Info  
33        SMS Order Confirmation Message to report the teleservice error.
  - 34      • If the value of the B/F field of the received message is '10', the mobile station  
35        may discard any incomplete SMS teleservice message being reassembled,  
36        and must store the INFO\_DATA field of the received message as the first  
37        segment of an SMS teleservice message being reassembled. Store the value  
38        of the SEQ\_NO field of the received message in SEQ\_NO<sub>s</sub>. Set the B/F field  
39        of the Alert With Info SMS Order Confirmation Message to '0'.

- 1       • If the value of the B/F field of the received message is '00' and a segmented  
2       SMS teleservice message is being reassembled, compare the value of the  
3       SEQ\_NO field of the received message to SEQ\_NO<sub>S</sub>. Set the B/F field of the  
4       Alert With Info SMS Order Confirmation Message to '0'. Take action as  
5       follows:
  - 6           + If (SEQ\_NO<sub>S</sub> + 1) modulo 8 is equal to the value of the SEQ\_NO field  
7           of the received message, store the INFO\_DATA field of the received  
8           message as the next segment of the SMS teleservice message being  
9           reassembled, and increment SEQ\_NO<sub>S</sub>, modulo 8.
  - 10          + If SEQ\_NO<sub>S</sub> is equal to the value of the SEQ\_NO field of the received  
11          message, the mobile station may discard the INFO\_DATA field of the  
12          received message.
  - 13          + If neither SEQ\_NO<sub>S</sub> nor (SEQ\_NO<sub>S</sub> + 1) modulo 8 is equal to the value  
14          of the SEQ\_NO field of the received message, the mobile station may  
15          discard the INFO\_DATA field of the received message and may  
16          discard the incomplete SMS teleservice message being reassembled.
- 17       • If the value of the B/F field of the received message is '00', and no segmented  
18       SMS teleservice message is being reassembled, the mobile station may  
19       discard the INFO\_DATA field of the received message. Set the B/F field of  
20       the Alert With Info SMS Order Confirmation Message to '0'.
- 21       • If the value of the B/F field of the received message is '01' and a segmented  
22       SMS teleservice message is being reassembled, store the INFO\_DATA field of  
23       the received message as the last segment of the SMS teleservice message and  
24       pass the complete SMS teleservice message to the SMS teleservice. Set the  
25       B/F field of the Alert With Info SMS Order Confirmation Message to '1'. If  
26       the teleservice reports an error, set the ERROR\_CLASS and CAUSE\_CODE  
27       fields of the Alert With Info SMS Order Confirmation Message to report the  
28       teleservice error.
- 29       • If the value of the B/F field of the received message is '01', and no segmented  
30       SMS teleservice message is being reassembled, the mobile station may  
31       discard the INFO\_DATA field of the received message. Set the  
32       ERROR\_CLASS and CAUSE\_CODE fields of the Alert With Info SMS Order  
33       Confirmation Message to report an error due to reception of an incomplete  
34       message. Set the B/F field of the Alert With Info SMS Order Confirmation  
35       Message to '0'.
- 36       - *Stop Alert:* Turn off signaling tone, and enter the Waiting for Order Task (see  
37       2.6.4.3.1).
- 38       - *Release:* Turn off signaling tone, wait 500 ms, and then enter the Release Task  
39       (see 2.6.4.5).
- 40       - *Audit:* Send order confirmation message to base station (see 2.7.2) and remain  
41       in the Waiting for Answer Task.

- 1       - *Flash With Info*: Send order confirmation message to base station (see 2.7.2) and  
2       remain in the Waiting for Answer task.
- 3       - *Message Waiting*: If the mobile station is capable of performing Message Waiting  
4       Notification, the mobile station shall indicate the presence of messages waiting  
5       based on the information contained in the message type field of the Message  
6       Waiting order (i.e., 0 for clear or no messages, other non-zero values indicate the  
7       number of messages waiting). The mobile station must send an order  
8       confirmation to the base station (see 2.7.2) and remain in the Waiting for Answer  
9       Task.
- 10      - *Maintenance*: Remain in the Waiting for Answer Task, and reset the alert timer  
11      to 65 seconds.
- 12      - *Change Power*: Adjust the transmitter to the power level indicated in the order  
13      qualification code (see 3.7.1.1 and 2.1.2.2) and send order confirmation message  
14      to base station (see 2.7.2). Remain in the Waiting for Answer Task.
- 15      - *Local Control*: If the local control status is enabled (see 2.6.1.2.2) and a local  
16      control order is received, the local control field must be examined to determine  
17      the action and confirmation to take.
- 18      - *Page*: Reply with Page Response. The mobile station must remain in the  
19      Waiting for Answer Task.
- 20      - *Serial Number Request*: Reply with Serial Number Response Message. The  
21      mobile station must remain in the Waiting for Answer Task.
- 22      - *SSD Update Order*: The mobile station computes SSD-A\_NEW and SSD-B\_NEW  
23      and selects a RANDBS as described in 2.3.12.1.8. Within 750 ms, the mobile  
24      station must begin transmitting a Base Station Challenge Order. Remain in the  
25      Waiting for Answer Task.
- 26      - *Unique Challenge Order*: The mobile station executes the Unique Challenge  
27      procedure as in 2.3.12.1.5. Within 750 ms, the mobile station must begin  
28      transmitting a Unique Challenge Order Confirmation message to the base  
29      station (see 2.7.2). Remain in the current task.
- 30      - *Message Encryption Mode Order*: The base station is activating/deactivating  
31      signaling message encryption. If the order qualifier field in the received message  
32      is set to '001', activate signaling message encryption. If the order qualifier field  
33      in the received message is set to '000', deactivate signaling message encryption.  
34      In either case, send an order confirmation message to the base station (see  
35      2.7.2) and remain in the Waiting for Answer Task.
- 36      - *Parameter Update Order*: Increment COUNT<sub>s-p</sub> (see 2.3.12.1.3) and send an  
37      order confirmation message to the base station (see 2.7.2). Remain in the  
38      Waiting for Answer Task.
- 39      - *Any other order*: Ignore order.

## 2.6.4.4 Conversation

When this task is entered, a release-delay timer must be set to 500 ms. If the termination status is enabled (see 2.6.3.8), the mobile station must set the termination status to disabled, wait 500 ms and then enter the Release Task (see 2.6.4.5).

Discontinuous transmission (see 2.3.11) must be inhibited for 1.5 seconds after the mobile station enters this task. That is, for at least 1.5 seconds after entering this task, a mobile station capable of discontinuous-transmission operation must remain in the DTX-high state.

The following may occur:

- If this task is entered as a result of receiving an *Analog Handoff Direction Message* (see 6.6.6.2.9), the mobile station must use the VMAC, ANALOG\_CHAN, and SCC values obtained from the *Analog Handoff Direction Message* to perform the following operations: adjust power level, tune to new channel, adjust to new SAT, and set SCC<sub>s</sub> to the value of the SCC field of the message (see 2.4.1). The mobile station must then turn on the transmitter, and reset the fade timer. The mobile station must set the message encryption mode to that indicated by the MEM value obtained from the *Analog Handoff Direction Message*. The mobile station may compare the SID value obtained from the *Analog Handoff Direction Message* with HOME\_SID<sub>p</sub>. If SID<sub>r</sub> = HOME\_SID<sub>p</sub>, the mobile station may set the ROAM status to disabled. If SID<sub>r</sub> ≠ HOME\_SID<sub>p</sub>, the mobile station may set the ROAM status to enabled. The mobile station must remain in the Conversation Task.
- If the user terminates the call, the release-delay timer must be examined. If the timer has expired, the Release Task must be entered (see 2.6.4.5). If the timer has not expired, the mobile station must wait until the timer expires and then enter the Release Task.
- If the user requests a flash, the mobile station must take the following steps. Set the flash-timer to 10 seconds. Mobile stations capable of discontinuous transmission operation (see 2.3.11) must inhibit discontinuous transmission for 1.5 seconds; that is, for at least 1.5 seconds the mobile station must remain in the DTX-high state. Immediately following the flash, a mobile station not capable of discontinuous transmission or a mobile station capable of discontinuous transmission but in the DTX-high state must turn on the signaling tone for 400ms.  
  
If the mobile station is capable of discontinuous transmission and is in the DTX-low state or the transition state when the flash occurs, the mobile station must enter the DTX-high state and wait 200 ms. Then it must turn on signaling tone for 400 ms. If a valid order (one that is not ignored) is received while processing a flash, the flash must be terminated immediately and the order must be processed. Flashes so terminated are not considered valid.
- If the flash-timer expires, the mobile station shall re-enable the DTMF tone generator if disabled.

- 1     • If the mobile station exits the Conversation task on the analog channel, the mobile  
2       station shall re-enable the DTMF tone generator if disabled, and stop the flash-timer  
3       if running.
- 4     • The mobile station may receive a Base Station Challenge Order Confirmation as part  
5       of the SSD Update process (see 2.3.12.1.8). The mobile station must compare the  
6       AUTHBS received in the Base Station Challenge Order Confirmation Message with  
7       that computed internally. Then, within 750 ms, the mobile station must begin  
8       transmitting an acknowledgement of the SSD Update Order with a success or failure  
9       indication as described in 2.3.12.1.8. Remain in the Conversation Task. If the  
10      mobile station fails to receive the Base Station Challenge Order Confirmation within  
11      10 seconds of when the Base Station Challenge Order was transmitted, terminate  
12      the SSD update process. The mobile station must remain in the Conversation Task.
- 13    • Within 100 ms of the receipt of any of the orders listed below, the mobile station  
14      must compare  $SCC_s$  to the PSCC field in the received message. If  $SCC_s \neq PSCC$ , the  
15      order must be ignored. If  $SCC_s = PSCC$ , the mobile station must take the following  
16      steps. Except for the audit order, mobile stations capable of discontinuous-  
17      transmission operation (see 2.3.11) must inhibit discontinuous transmission for 1.5  
18      seconds; that is, for at least 1.5 seconds the mobile station must remain in the DTX-  
19      high state. Upon receipt of the audit order, mobile stations capable of  
20      discontinuous transmission must inhibit discontinuous transmission for at least 5  
21      seconds. Immediately after determining that  $SCC_s = PSCC$  a mobile station not  
22      capable of discontinuous transmission or a mobile station capable of discontinuous  
23      transmission but in the DTX-high state must take the actions specified below for  
24      each order.
- 25      If the mobile station is capable of discontinuous transmission and is in the DTX-low  
26      state or the transition state when the order arrives, the mobile station must enter  
27      the DTX-high state and wait 200 ms. Then it must take the actions specified below  
28      for each order.
- 29      - *Handoff (to Analog Voice Channel):* Turn on signaling tone for 50 ms, turn off  
30       signaling tone, turn off transmitter, adjust power level, tune to new channel,  
31       adjust to new SAT, set  $SCC_s$  to the value of the SCC field of the message (see  
32       2.4.1), turn on transmitter, reset fade timer, and remain in the Conversation  
33       Task.
- 34      - *Handoff (to Digital Traffic Channel):* Requires further study.
- 35      - *Send Called-Address:*
  - 36       + If the flash-timer has not expired, stop the flash-timer, re-enable the DTMF  
37       tone generator if disabled, send the called-address to the base station (see  
38       2.7.2) and remain in the Conversation Task.
  - 39       + Otherwise, ignore the order and remain in the Conversation Task.

- *Disable DTMF Order:* Send an order confirmation message to the base station (see 2.7.2). The mobile station must then disable its DTMF tone generator until the Called Address message sent to the base station in response to the next Send Called-Address message received by the mobile station has been completely transmitted. The mobile station must remain in the Conversation Task.

- *Alert or Alert With Info:* Turn on signaling tone, wait 500 ms, and then enter the Waiting for Answer Task (see 2.6.4.3.2).

- *Alert With Info SMS:* Within 750 ms the mobile station must send an Alert With Info SMS Order Confirmation message. Remain in the Conversation Task.

Process the Alert With Info SMS message as follows:

- If the value of the B/F field of the received message is '11', the INFO\_DATA field of the received message contains an unsegmented SMS teleservice message. The mobile station may discard any incomplete SMS teleservice message being reassembled, and should pass the INFO\_DATA field of the received message to the SMS teleservice. Set the B/F field of the Alert With Info SMS Order Confirmation Message to '1'. If the teleservice reports an error, set the ERROR\_CLASS and CAUSE\_CODE fields of the Alert With Info SMS Order Confirmation Message to report the teleservice error.
- If the value of the B/F field of the received message is '10', the mobile station may discard any incomplete SMS teleservice message being reassembled, and must store the INFO\_DATA field of the received message as the first segment of an SMS teleservice message being reassembled. Store the value of the SEQ\_NO field of the received message in SEQ\_NO<sub>s</sub>. Set the B/F field of the Alert With Info SMS Order Confirmation Message to '0'.
- If the value of the B/F field of the received message is '00' and a segmented SMS teleservice message is being reassembled, compare the value of the SEQ\_NO field of the received message to SEQ\_NO<sub>s</sub>. Set the B/F field of the Alert With Info SMS Order Confirmation Message to '0'. Take action as follows:
  - + If (SEQ\_NO<sub>s</sub> + 1) modulo 8 is equal to the value of the SEQ\_NO field of the received message, store the INFO\_DATA field of the received message as the next segment of the SMS teleservice message being reassembled, and increment SEQ\_NO<sub>s</sub>, modulo 8.
  - + If SEQ\_NO<sub>s</sub> is equal to the value of the SEQ\_NO field of the received message, the mobile station may discard the INFO\_DATA field of the received message.
  - + If neither SEQ\_NO<sub>s</sub> nor (SEQ\_NO<sub>s</sub> + 1) modulo 8 is equal to the value of the SEQ\_NO field of the received message, the mobile station may discard the INFO\_DATA field of the received message and may discard the incomplete SMS teleservice message being reassembled.

- 1       • If the value of the B/F field of the received message is '00', and no segmented  
2       SMS teleservice message is being reassembled, the mobile station may  
3       discard the INFO\_DATA field of the received message. Set the B/F field of  
4       the Alert With Info SMS Order Confirmation Message to '0'.
- 5       • If the value of the B/F field of the received message is '01' and a segmented  
6       SMS teleservice message is being reassembled, store the INFO\_DATA field of  
7       the received message as the last segment of the SMS teleservice message and  
8       pass the complete SMS teleservice message to the SMS teleservice. Set the  
9       B/F field of the Alert With Info SMS Order Confirmation Message to '1'. If  
10      the teleservice reports an error, set the ERROR\_CLASS and CAUSE\_CODE  
11      fields of the Alert With Info SMS Order Confirmation Message to report the  
12      teleservice error.
- 13      • If the value of the B/F field of the received message is '01', and no segmented  
14      SMS teleservice message is being reassembled, the mobile station may  
15      discard the INFO\_DATA field of the received message. Set the  
16      ERROR\_CLASS and CAUSE\_CODE fields of the Alert With Info SMS Order  
17      Confirmation Message to report an error due to reception of an incomplete  
18      message. Set the B/F field of the Alert With Info SMS Order Confirmation  
19      Message to '0'.
- 20      - *Release:* Examine the release-delay timer. If the timer has expired, the mobile  
21      station must enter the Release Task (see 2.6.4.5). If the timer has not expired,  
22      the mobile station must wait until the timer expires and then enter the Release  
23      Task.
- 24      - *Audit:* Send order confirmation message to base station (see 2.7.2) and remain  
25      in the Conversation Task.
- 26      - *Flash With Info:* Send order confirmation message to the base station (see 2.7.2)  
27      and remain in the Conversation Task.
- 28      - *Message Waiting:* If the mobile station is capable of performing Message Waiting  
29      Notification, the mobile station shall indicate the presence of messages waiting  
30      based on the information contained in the message type field of the Message  
31      Waiting order (i.e., 0 for clear or no messages, other non-zero values indicate the  
32      number of messages waiting). The mobile station must send an order  
33      confirmation to the base station (see 2.7.2) and remain in the Conversation  
34      Task.
- 35      - *Maintenance:* Turn on signaling tone, wait 500 ms, and then enter the Waiting  
36      for Answer Task (see 2.6.4.3.2).
- 37      - *Change Power:* Adjust the transmitter to the power level indicated by the order  
38      qualification code (see 3.7.1.1 and 2.1.2.2) and send order confirmation message  
39      to base station (see 2.7.2). Remain in the Conversation Task. If the mobile  
40      station is capable of discontinuous transmission and is in the DTX-low state or  
41      the transition state when this order arrives, the mobile station must immediately  
42      enter the DTX-high state at the power level indicated in the order.

- 1       - *Local Control:* If the local control status is enabled (see 2.6.1.2.2) and a local  
2       control order is received, the local control field must be examined to determine  
3       the action and confirmation to take.
- 4       - *Page:* Reply with Page Response. The mobile station must remain in the  
5       Conversation Task.
- 6       - *Serial Number Request:* Reply with Serial Number Response Message. The  
7       mobile station must remain in the Conversation Task.
- 8       - *SSD Update Order:* The mobile station computes SSD-A\_NEW and SSD-B\_NEW  
9       and selects a RANDBS as described in 2.3.12.1.8. Within 750 ms, the mobile  
10      station must begin transmitting a Base Station Challenge Order. Remain in the  
11      Conversation Task.
- 12      - *Unique Challenge Order:* The mobile station executes the Unique Challenge  
13      procedure as in 2.3.12.1.5. Within 750 ms, the mobile station must begin  
14      transmitting a Unique Challenge Order Confirmation message to the base  
15      station (see 2.7.2). Remain in the Conversation Task.
- 16      - *Message Encryption Mode Order:* The base station is activating/deactivating  
17      signaling message encryption. If the order qualifier field in the received message  
18      is set to '001', activate signaling message encryption. If the order qualifier field  
19      in the received message is set to '000', deactivate signaling message encryption.  
20      In either case, send an order confirmation message to the base station (see  
21      2.7.2) and remain in the Conversation Task.
- 22      - *Parameter Update Order:* Increment COUNT<sub>S-p</sub> (see 2.3.12.1.3) and send an  
23      order confirmation message to the base station (see 2.7.2). Remain in the  
24      Conversation Task.
- 25      - *Any other order:* Ignore order.

#### 26   2.6.4.5 Release

27   Discontinuous transmission (see 2.3.11) is prohibited while the mobile station is in this  
28   task. That is, a mobile station capable of discontinuous-transmission operation must  
29   remain in the DTX-high state. Any mobile station in the DTX-low state must immediately  
30   enter the DTX-high state, wait 200 ms. While in the DTX-high state, the mobile station  
31   shall do the following:

- 32       • Send signaling tone for 1.8 seconds. If a flash (see 2.6.4.4) was being sent when this  
33       task was entered, signaling tone must continue to be sent for no more than 1.8  
34       seconds.
- 35       • Stop sending signaling tone.
- 36       • Turn off the transmitter.

37   The mobile station must then enter the Serving-System Determination Task (see 2.6.3.12).



#### 1 2.6.4.6 Power Down

2 If the mobile station is intentionally removed from the air interface while it is tuned to an  
3 analog voice channel the mobile station must immediately prohibit discontinuous  
4 transmission (see 2.3.1.1). That is, a mobile station capable of discontinuous-transmission  
5 operation must remain in the DTX-high state. Any mobile station in the DTX-low state  
6 must immediately enter the DTX-high state, wait 200 ms. While in the DTX-high state, the  
7 mobile station shall do the following:

- 8 • If  $PDREG_s = 1$  the mobile station must send an autonomous registration message  
9 with a power down indication on the reverse voice channel.
- 10 • Send signaling tone for 1.8 seconds. If a flash (2.6.4.4) was being sent when this  
11 task was entered, signaling tone must continue to be sent for no more than 1.8  
12 seconds.
- 13 • Stop sending signaling tone, turn off the transmitter and then power down.

#### 14 2.7 Signaling Formats

15 In the message formats used between the mobile stations and base stations, some bits are  
16 marked as reserved (RSVD). Some or all of these reserved bits may be used in the future  
17 for additional messages. Therefore, all mobile stations and base stations must set all bits  
18 that they are programmed to treat as reserved bits to '0' (zero) in all messages that they  
19 transmit. All mobile stations and base stations must ignore the state of all bits that they  
20 are programmed to treat as reserved bits in all messages that they receive.

##### 21 2.7.1 Reverse Analog Control Channel (RECC)

22 The reverse analog control channel (RECC) is a wideband data stream sent from the mobile  
23 station to the base station. This data stream must be generated at a 10 kbps  $\pm$  1 bit/second  
24 rate. Figure 2.7.1-1 depicts the format of the RECC data stream.

25

Information element	Length (bits)	
DOTTING = 1010...010	30	↑ Seizure Precursor ↓
WORD SYNC = 11100010010	11	
CODED DCC [Coded per Table 2.7.1-1]	7	
1st Word Repeated 5 times	240	
2nd Word Repeated 5 times	240	
3rd Word Repeated 5 times	240	
...		

**Figure 2.7.1-1. Reverse Analog Control Channel Message Stream (Mobile-to-Base)**

All messages begin with the RECC seizure precursor that is composed of a 30-bit dotting sequence (1010...010), an 11-bit word sync sequence (11100010010), and the coded digital color code (DCC). The 7-bit coded DCC is obtained by translating the received DCC according to Table 2.7.1-1.

**Table 2.7.1-1. Coded Digital Color Code**

Received DCC	7-Bit Coded DCC
00	0000000
01	0011111
10	1100011
11	1111100

Each word contains 48 bits, including parity, and is repeated five times; it is then referred to as a word block. A word is formed by encoding 36 content bits into a (48, 36) BCH code that has a distance of 5, (48, 36; 5). The left-most bit (i.e., earliest in time) shall be designated the most-significant bit. The 36 most-significant bits of the 48-bit field shall be the content bits. The generator polynomial for the code is the same as for the (40, 28; 5) code used on the forward control channel (see 3.7.1).

#### 2.7.1.1 Reverse Analog Control Channel (RECC) Messages

Each RECC message can consist of one to six words. The types of messages to be transmitted over the reverse control channel are:

- Page Response Message

- 1 • Origination Message
- 2 • Order Confirmation Message
- 3 • Order Message

4 These messages are made up of combinations of the following five words. Note: If included,  
 5 Words are to be transmitted in the order shown.

6 Word A - Abbreviated Address Word

Information Element	Length (bits)
F	1
NAWC	3
T	1
S	1
E	1
ER=0	1
SCM (3-0)	4
MIN1	24
P	12

7

8 Word B - Extended Address Word

Information Element	Length (bits)
F = 0	1
NAWC	3
LOCAL/MSG_TYPE	5
ORDQ	3
ORDER	5
LT	1
EP	1
SCM(4)	1
MPCI	2
SDCC1	2
SDCC2	2
MIN2 <sub>33-24</sub>	10
P	12

9

## 1 Word C - Serial Number Word

Information Element	Length (bits)
F = 0	1
NAWC	3
ESN	32
P	12

2

## 3 Word C - Authentication Word

Information Element	Length (bits)
F = 0	1
NAWC	3
COUNT	6
RANDC	8
AUTHR	18
P	12

4

## 5 Word C - Unique Challenge Order Confirmation Word

Information Element	Length (bits)
F = 0	1
NAWC	3
RSVD = 000...000	14
AUTHU	18
P	12

6

## 7 Word C - Base Station Challenge Word

Information Element	Length (bits)
F = 0	1
NAWC	3
RANDBS	32
P	12

8

1 Word D - First Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC	3
1st DIGIT	4
2nd DIGIT	4
3rd DIGIT	4
4th DIGIT	4
5th DIGIT	4
6th DIGIT	4
7th DIGIT	4
8th DIGIT	4
P	12

2

3 Word E - Second Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC = 0	3
9th DIGIT	4
10th DIGIT	4
11th DIGIT	4
12th DIGIT	4
13th DIGIT	4
14th DIGIT	4
15th DIGIT	4
16th DIGIT	4
P	12

4

5 The interpretation of the data fields is as follows:

6 F - First word indication field. Set to '1' in first word and '0' in  
7 subsequent words.

8 NAWC - Number of additional words coming field.

- 1           T    - T field. Set to '1' to identify the message as an origination or an order;  
2                    set to '0' to identify the message as an order response or page  
3                    response.
- 4           S    - Send serial number field. If the serial number word is sent, set to '1';  
5                    if the serial number word is not sent, set to '0'.
- 6           E    - Extended address field. If the extended address word is sent, set to  
7                    '1'; if the extended address word is not sent, set to '0'.
- 8           EP   - Extended Protocol Capability Indicator. (The mobile station shall set  
9                    EP = '0' except when implementing the optional procedures in Section  
10                   4 (see 4.2).
- 11          ER   - The Extended Protocol Reverse Channel (ER) bit is used to indicate  
12                   that the current message is in the Extended Protocol. If the ER bit is  
13                   a "zero" (0), the message format of 2.7.1.1 above, is being used. If the  
14                   ER bit is a "one" (1), the Extended Protocol message format is being  
15                   used.
- 16          COUNT - A modulo-64 count maintained by the mobile station and used for  
17                   authentication and anti-fraud purposes.
- 18          RANDC - An 8-bit number used to confirm the last RAND received by the  
19                   mobile station.
- 20          SCM(4-0) - The station class mark field (see 2.3.3).
- 21          MPCI   - '00' indicates EIA-553 or IS-54-A mobile station.  
22                    '01' Reserved. (used to indicate EIA/TIA IS-54-B dual-mode mobile  
23                    station).  
24                    '10' indicates CDMA-capable dual-mode mobile station.  
25                    '11' reserved.
- 26          SDCC1, SDCC2 - Supplementary Digital Color Codes. If the Supplementary Digital  
27                    Color Code feature is utilized, the combination of SDCC1 and SDCC2  
28                    transmitted by the base station must be a non-zero number. Mobile  
29                    stations which respond with a non-zero SDCC combination are  
30                    capable of supporting SDCC. Mobile stations which respond with a  
31                    zero SDCC combination are not capable of supporting SDCC. The  
32                    zero SDCC combination is used to indicate either that SDCC1 and  
33                    SDCC2 are not used or are not supported.
- 34          ORDER   - Order field. Identifies the order type (see Table 3.7.1.1-1).
- 35          ORDQ    - Order qualifier field. Qualifies the order confirmation to a specific  
36                    action (see Table 3.7.1.1-1).
- 37          LOCAL   - Local control field. This field is specific to each system. The ORDER  
38                    field must be set to local control (see Table 3.7.1.1-1) for this field to  
39                    be interpreted.

- 1       MSG\_TYPE   -   Message type field. Qualifies the order to a specific action (see  
2                   Table 3.7.1.1-1).
- 3               LT   -   Last-try code field (see 2.6.3.8).
- 4               MIN1   -   First part of the mobile identification number field (see 2.3.1).
- 5               MIN2   -   Second part of the mobile identification number field (see 2.3.1).
- 6               ESN   -   Electronic Serial Number field. Identifies the electronic serial number  
7                   of the mobile station (see 2.3.2).
- 8               DIGIT   -   Digit field (see Table 2.7.1.1-1).
- 9               AUTHR   -   Output response of the authentication algorithm.
- 10              AUTHU   -   Output of the authentication algorithm when responding to a Unique  
11                   Challenge order (see 2.3.12.1.5).
- 12              RANDBS   -   Random number used in the SSD update procedure (see 2.3.12.1.8).
- 13              RSVD   -   Reserved for future use; all bits must be set as indicated.
- 14              P       -   Parity field.

Table 2.7.1.1-1. Digit Code

Digit	Code	Digit	Code
1	0001	7	0111
2	0010	8	1000
3	0011	9	1001
4	0100	0	1010
5	0101	*	1011
6	0110	#	1100
		Null	0000

**Notes:**

1. The digit 0 is encoded as binary "ten"; not binary "zero."
2. The code 0000 is the null code, indicating no digit present.
3. All other four-bit sequences are reserved, and must not be transmitted.

- 1 Examples of encoding called-address information into the called-address words are given  
 2 below:

- 3 I. If the number 2# is entered, the word is:

Information Element	Value	Length (bits)
F = 0	NOTE	1
NAWC	NOTE	3
1st DIGIT	0010	4
2nd DIGIT	1100	4
3rd DIGIT	0000	4
4th DIGIT	0000	4
5th DIGIT	0000	4
6th DIGIT	0000	4
7th DIGIT	0000	4
8th DIGIT	0000	4
P		12

- 4  
 5 II. If the number 13792640 is entered, the word is:

Information Element	Value	Length (bits)
F = 0	NOTE	1
NAWC	NOTE	3
1st DIGIT	0001	4
2nd DIGIT	0011	4
3rd DIGIT	0111	4
4th DIGIT	1001	4
5th DIGIT	0010	4
6th DIGIT	0110	4
7th DIGIT	0100	4
8th DIGIT	1010	4
P		12



1 III. If the number \*24273258 is entered, the words are:

2 Word D - First Word of the Called-Address

Information Element	Value	Length (bits)
F = 0	NOTE	1
NAWC	NOTE	3
1st DIGIT	1011	4
2nd DIGIT	0010	4
3rd DIGIT	0100	4
4th DIGIT	0010	4
5th DIGIT	0111	4
6th DIGIT	0011	4
7th DIGIT	0010	4
8th DIGIT	0101	4
P		12

3

4 Word E - Second Word of the Called-Address

Information Element	Value	Length (bits)
F = 0	NOTE	1
NAWC = 0	NOTE	3
9th DIGIT	1000	4
10th DIGIT	0000	4
11th DIGIT	0000	4
12th DIGIT	0000	4
13th DIGIT	0000	4
14th DIGIT	0000	4
15th DIGIT	0000	4
16th DIGIT	0000	4
P		12

5

6 NOTE: These four bits depend on the type of message.

### 2.7.2 Reverse Analog Voice Channel (RVC)

The reverse voice channel (RVC) is a wideband data stream sent from the mobile station to the base station. This data stream must be generated at a 10 kbps  $\pm$  1 bps rate. Figure 2.7.2-1 depicts the format of the RVC data stream.

Information Element	Length (bits)
DOTTING	101
W.S.	11
Repeat 1 of WORD1	48
dotting	37
W.S.	11
Repeat 2 of WORD 1	48
dotting	37
W.S.	11
...	...
Repeat 5 of WORD 1	48
dotting	37
W.S.	11
Repeat 1 of WORD 2	48
dotting	37
W.S.	11
...	...
Repeat 5 of WORD 2	48

DOTTING = 1010....101

W.S. (WORD SYNC) = 11100010010

**Figure 2.7.2-1. RVC Message Stream (Mobile-to-Base)**

1 A 37-bit dotting sequence (1010....101) and an 11-bit word sync sequence (11100010010)  
 2 are sent to permit base stations to achieve synchronization with the incoming data, except  
 3 at the first repeat of word 1 of the message where a 101-bit dotting sequence is used. Each  
 4 word contains 48 bits, including parity, and is repeated five times together with the 37-bit  
 5 dotting and 11-bit word sync sequences; it is then referred to as a word block. For a multi-  
 6 word message, the second word block is formed the same as the first word block including  
 7 the 37-bit dotting and 11-bit word sync sequences. A word is formed by encoding the 36  
 8 content bits into a (48, 36) BCH code that has a distance of 5, (48, 36; 5). The left-most bit  
 9 (i.e., earliest in time) shall be designated the most-significant bit. The 36 most-significant  
 10 bits of the 48-bit field shall be the content bits. The generator polynomial for the code is  
 11 the same as for the (40, 28; 5) code used on the forward control channel (see 3.7.1).

#### 12 2.7.2.1 Reverse Analog Voice Channel (RVC) Messages

13 Each RVC message can consist of one or two words. Formats are shown for the following  
 14 RVC message types:

- 15 • Order Confirmation Message
- 16 • Called-Address Message
- 17 • Serial Number Response Message
- 18 • Page Response
- 19 • Unique Challenge Order Confirmation
- 20 • Base Station Challenge Order Message
- 21 • Alert With Info SMS Order Confirmation

#### 22 Order Confirmation Message

Information Element	Length (bits)
F = 1	1
NAWC = 00	2
T = 1	1
LOCAL/MSG_TYPE	5
ORDQ	3
ORDER	5
RSVD = 000 ... 000	19
P	12

- 1 Called-Address Message:
- 2 Word 1 - First Word of the Called-Address

Information Element	Length (bits)
F = 1	1
NAWC	2
T = 0	1
1st DIGIT	4
2nd DIGIT	4
3rd DIGIT	4
4th DIGIT	4
5th DIGIT	4
6th DIGIT	4
7th DIGIT	4
8th DIGIT	4
P	12

- 3
- 4 Word 2 - Second Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC = 00	2
T = 0	1
9th DIGIT	4
10th DIGIT	4
11th DIGIT	4
12th DIGIT	4
13th DIGIT	4
14th DIGIT	4
15th DIGIT	4
16th DIGIT	4
P	12

5

## 1 Serial Number Response Message:

## 2 Word 1 of Serial Number Response Message

Information Element	Length (bits)
F = 1	1
NAWC = 01	2
T = 1	1
LOCAL/MSG_TYPE = 00000	5
ORDQ	3
ORDER	5
RSVD = 000 ... 000	19
P	12

3

## 4 Word 2 of Serial Number Response Message

Information Element	Length (bits)
F = 0	1
NAWC = 00	2
T = 1	1
ESN	32
P	12

5

## 6 Page Response

Information Element	Length (bits)
F = 1	1
NAWC = 00	2
T = 1	1
MSG_TYPE = 00000	5
ORDQ = 000	3
ORDER = 00000	5
RSVD = 000 ... 000	19
P	12

7

1 Unique Challenge Order Confirmation Message

Information Element	Length (bits)
F = 1	1
NAWC = 00	2
T = 1	1
LOCAL/MSG_TYPE = 0...0	5
ORDQ	3
ORDER	5
AUTHU	18
RSVD = 0	1
P	12

2

3 Base Station Challenge Order Message

4 Word 1 of Base Station Challenge Order Message

Information Element	Length (bits)
F = 1	1
NAWC = 01	2
T = 1	1
LOCAL/MSG_TYPE = 0...0	5
ORDQ	3
ORDER	5
RSVD = 000 ... 000	19
P	12

5

6 Word 2 of Base Station Challenge Order Message

Information Element	Length (bits)
F = 0	1
NAWC = 00	2
T = 1	1
RANDBS	32
P	12

7

## 1 Alert With Info SMS Order Confirmation Message

Information Element	Length (bits)
F = 1	1
NAWC = 00	2
T = 1	1
LOCAL/MSG_TYPE = 00001	5
ORDQ = 000	3
ORDER = 10001	5
B/F	1
ERROR_CLASS	2
CAUSE_CODE	8
SEQ_NO	3
RSVD = 00000	5
P	12

2

3 The interpretation of the data fields is as follows:

- 4 F - First word field. Set to '1' in first word and '0' in second word.
- 5 NAWC - Number of additional words coming field.
- 6 T - T field. Set to '1' to identify the message as an order or order  
7 confirmation. Set to '0' to identify the message as a called-address.
- 8 DIGIT - Digit field (see Table 2.7.1.1-1).
- 9 ORDER - Order field. Identifies the order type (see Table 3.7.1.1-1).
- 10 ORDQ - Order qualifier field. Qualifies the order confirmation to a specific  
11 action (see Table 3.7.1.1-1).
- 12 B/F - Begin/Final. This field is used to indicate whether the  
13 ERROR\_CLASS and CAUSE\_CODE fields include the teleservice  
14 processing result for an SMS teleservice message. If no teleservice  
15 processing result is included, this field shall be set to '0'. If a  
16 teleservice processing result is included, this field shall be set to '1'.
- 17 ERROR\_CLASS - Error report class.  
18 If there is no error, this field shall be set to '00'.  
19 If the error is caused by a temporary condition, this field shall be set  
20 to '10'. If the error is caused by a permanent condition, this field  
21 shall be set to '11'.

- 1           LOCAL   - Local Control field. This field is specific to each system. The ORDER
- 2                    field must be set to local control (see Table 3.7.1.1-1) for this field to
- 3                    be interpreted.
- 4           MSG\_TYPE - Message Type field. Qualifies the order (see Table 3.7.1.1-1).
- 5           RSVD   - Reserved for future use; all bits must be set as indicated.
- 6           AUTHU   - Output of the authentication algorithm when responding to a Unique
- 7                    Challenge order (see 2.3.12.1.5).
- 8           RANDBS   - Random number used in the SSD update procedure (see 2.3.12.1.8).
- 9           ESN   - Electronic Serial Number field. Identifies the electronic serial number
- 10                   of the mobile station (see 2.3.2).
- 11   CAUSE\_CODE   - Cause code. This field provides the delivery status of SMS user data.
- 12                   (See 3.4.3.6 of TIA/EIA/IS-637.)
- 13           SEQ\_NO   - Sequence number. This field contains the SEQ\_NO of the Alert With
- 14                    Info SMS message that is being acknowledged by the mobile station.
- 15           P   - Parity field.
- 16



1

2

3 No text.

4

### 3 REQUIREMENTS FOR BASE STATION ANALOG OPERATION

The optional narrow analog mode of operation as defined in TIA/EIA/IS-91, Section 3, is incorporated into this standard for the base stations that have optionally implemented the narrow analog mode.

See also Section 5.

#### 3.1 Transmitter

##### 3.1.1 Frequency Parameters

###### 3.1.1.1 Channel Spacing and Designation

Channel spacing shall be 30 kHz and the base station transmit channel at 870.030 MHz (and the corresponding dual-mode mobile station transmit channel at 825.030 MHz) shall be termed channel number 1. The 20 MHz range of channels 1 through 666 as shown in Table 2.1.1.1-1 for System A and System B is basic. The additional 5 MHz of channels 667 through 799 and (wrap-around) 991 through 1023 for extending Systems A and B is mandatory. The station class mark (SCM, see 2.3.3) of a mobile station must be taken into account in the consideration of assignment of a channel in this extended band.

###### 3.1.1.2 Frequency Tolerance

The base station carrier frequency must be maintained within  $\pm 1.5$  parts per million (ppm) of any assigned channel frequency.

##### 3.1.2 Power Output Characteristics

Maximum effective radiated power (ERP) and antenna height above average terrain (HAAT) must be coordinated locally on an ongoing basis.

##### 3.1.3 Modulation Characteristics

###### 3.1.3.1 Analog Voice Signals

The (FM) modulator is preceded by the following five voice-processing stages (in the order listed):

- Transmit Audio Level Adjustment
- Compressor
- Pre-Emphasis
- Deviation Limiter
- Post Deviation-Limiter Filter

Pending the generation of a complete speech transmission plan for dual-mode cellular systems, the following requirements shall be met to ensure compatibility with the transmission plan for fixed digital speech networks.

### 3.1.3.1.1 Compressor

This stage is the compressor portion of a 2:1 syllabic compandor. For every 2 dB change in input level to a 2:1 compressor within its operating range, the change in output level is a nominal 1 dB. The compressor must have a nominal attack time of 3 ms and a nominal recovery time of 13.5 ms as defined by CCITT Recommendation G.162. The nominal reference input level to the compressor is that corresponding to a 1000 Hz acoustic tone at the expected nominal speech volume level. This level must produce a nominal  $\pm 2.9$  kHz peak frequency deviation of the transmitted carrier.

### 3.1.3.1.2 Pre-emphasis

The pre-emphasis characteristic must have a nominal +6 dB/octave response between 300 and 3000 Hz.

### 3.1.3.1.3 Deviation Limiter

For audio (voice) inputs applied to the transmitter analog voice-signal processing stages, a base station must limit the instantaneous frequency deviation to  $\pm 12$  kHz. This requirement excludes supervision signals (see 3.4) and wideband data signals (see 3.1.3.2).

### 3.1.3.1.4 Post Deviation-Limiter Filter

The deviation limiter must be followed by a low-pass filter whose characteristics are:

Frequency Band	Attenuation Relative to 1000 Hz
3000 - 15000 Hz	$\geq 40 \log (f/3000)$ dB
above 15000 Hz	$\geq 28$ dB

19

### 3.1.3.1.5 Transmit Level Adjustment

The base station shall set the transmit level so that a 1004 Hz tone at a level of -18 dBm<sub>0</sub> at the network interface produces a  $\pm 2.9$  kHz peak frequency deviation of the transmitted carrier. Measurement techniques are described in IS-97 "Recommended Minimum Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

### 3.1.3.2 Wideband Data Signals

#### 3.1.3.2.1 Encoding

The forward control channel (FOCC) and forward voice channel (FVC) wideband data streams (see 3.7) must be further encoded such that each nonreturn-to-zero binary one is transformed to a zero-to-one transition, and each nonreturn-to-zero binary zero is transformed to a one-to-zero transition.

1   **3.1.3.2.2 Modulation and Polarity**

2   The filtered wideband data stream must then be used to modulate the transmitter carrier  
3   using direct binary frequency shift keying. A one (i.e., high state) into the modulator must  
4   correspond to a nominal peak frequency deviation 8 kHz above the carrier frequency, and a  
5   zero into the modulator must correspond to a nominal peak frequency deviation 8 kHz  
6   below the carrier frequency.

7   **3.1.4 Limitations on Emissions**

8   **3.1.4.1 Bandwidth Occupied**

9   Modulation products outside the region  $\pm 20$  kHz from the carrier shall not exceed a level of  
10   26 dB below the unmodulated carrier. Modulation products outside the region of  $\pm 45$  kHz  
11   from the carrier shall not exceed a level of 45 dB below the unmodulated carrier.  
12   Modulation products outside the region of  $\pm 90$  kHz from the carrier shall not exceed a level  
13   of (a) 60 dB below the unmodulated carrier, or (b) 43 plus  $10 \log_{10}$  (mean output power in  
14   watts) dB below the unmodulated carrier. Measurement techniques are defined in the  
15   current IS-97 "Recommended Minimum Performance Standards for Base Stations  
16   Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

17   **3.1.4.2 Conducted Spurious Emissions**

18   Refer to IS-97 "Recommended Minimum Performance Standards for Base Stations  
19   Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

20   **3.1.4.3 Radiated Spurious Emissions**

21   Refer to IS-97 "Recommended Minimum Performance Standards for Base Stations  
22   Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

23   **3.1.4.4 Intermodulation**

24   Radiated products from co-located transmitters shall not exceed FCC spurious and  
25   harmonic level requirements that would apply to any of the transmitters operated singly.

26   **3.2 Receiver**

27   **3.2.1 Frequency Parameters**

28   **3.2.1.1 Channel Spacing and Designation**

29   Channel spacing shall be 30 kHz and the base station receive channel at 825.030 MHz (and  
30   the corresponding dual-mode mobile station receive channel at 870.030 MHz) shall be  
31   termed channel number 1. The 20 MHz range of channels 1 through 666 as shown in  
32   Table 2.1.1.1-1 for System A and System B is basic. The additional 5 MHz of channels 667  
33   through 799 and (wrap-around) 991 through 1023 for extending Systems A and B is  
34   mandatory. The station class mark (SCM, see 2.3.3) of a mobile station must be taken into  
35   account in the consideration of assignment of a channel in this extended band.

1    3.2.2 Demodulation Characteristics

2    3.2.2.1 Analog Voice Signals

3    The demodulator is followed by the following three voice-signal processing stages:

- 4        • De-emphasis
- 5        • Expander
- 6        • Receive Audio Level Adjustment

7    Pending the generation of a complete speech transmission plan for dual-mode cellular  
8    systems, the following requirements shall be met to ensure compatibility with the  
9    transmission plan for fixed digital speech networks.

10   3.2.2.1.1 De-emphasis

11   The de-emphasis characteristic must have a nominal -6 dB per octave response between  
12   300 and 3000 Hz.

13   3.2.2.1.2 Expander

14   This stage is the expander portion of a 2:1 syllabic compander. For every 1 dB change in  
15   input level to a 1:2 expander, the change in output level is a nominal 2 dB. The signal  
16   expansion must follow all other demodulation signal processing (including the 6 dB/octave  
17   de-emphasis and filtering). The expander must have a nominal attack time of 3 ms and a  
18   nominal recovery time of 13.5 ms as defined by CCITT Recommendation G.162.

19   The nominal reference input level to the expander is that corresponding to a 1000 Hz tone  
20   from a carrier with a  $\pm 2.9$  kHz peak frequency deviation.

21   3.2.2.1.3 Audio Level Adjustment

22   The base station shall set the audio level so that a received 1004 Hz tone with a  $\pm 2.9$  kHz  
23   peak frequency deviation produces a level of -18 dBm0 at the network interface.  
24   Measurement techniques are described in IS-97 "Recommended Minimum Performance  
25   Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular  
26   Mobile Stations."

27   3.2.3 Limitations on Emissions

28   Refer to IS-97 "Recommended Minimum Performance Standards for Base Stations  
29   Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

30   3.2.4 Other Receiver Parameters

31   System performance is predicated upon receivers meeting IS-97 "Recommended Minimum  
32   Performance Standards for Base Stations Supporting Dual-Mode Wideband Spread  
33   Spectrum Cellular Mobile Stations."

**3.3 Security and Identification****3.3.1 Authentication**

The term "authentication" refers to the process during which information is exchanged between a mobile station and the base station for the purposes of enabling the base station to confirm the identity of the mobile station. In short, a successful outcome of the authentication process occurs only when it can be demonstrated that the mobile station and base station possess identical sets of Shared Secret Data (SSD). Details of the procedures are given in 2.3.12.1.

**3.3.2 Encryption**

If the base station supports mobile station authentication (see 3.3.1), it may also support message encryption by providing the capability to send encrypted control messages and to perform the operations of encryption and decryption as specified in 2.3.12.2.

**3.4 Supervision****3.4.1 Supervisory Audio Tone****3.4.1.1 SAT Detection**

Reserved.

**3.4.1.2 SAT Transmission**

Whenever a base station transmitter is active on a voice channel, one of the following tones must be modulated on the carrier with a frequency deviation of  $\pm 2$  kHz  $\pm 10$  percent:

- 5970 Hz.
- 6000 Hz.
- 6030 Hz.

The frequency tolerance of the tone must be  $\pm 1$  Hz.

**3.4.1.3 Fade Timing Status**

Reserved.

**3.4.2 Signaling Tone Detection**

Reserved.

**3.5 Malfunction Detection**

Reserved.

### 3.6 Call Processing

The following sections describe the base station operation to control the mobile station. Frequent references are made to the corresponding sections in the mobile section and to the messages that flow between the base station and the mobile station. It is helpful to read 2.6 and 3.6 in parallel and examine the message formats in 2.7 and 3.7 at the same time.

#### 3.6.1 Overhead Functions for Mobile Station Initiation

To control mobile stations executing the Initialization Task (see 2.6.1), the following information must be sent in the overhead message train (see 3.7.1.2 for the formats of the messages):

- First part of the system identification (SID1).
- Number of paging channels (N).

#### 3.6.2 Mobile Station Control on the Control Channel

##### 3.6.2.1 Overhead Information

To control mobile stations monitoring a control channel, the following overhead information must be sent in the System Parameter Overhead Message (see 3.7.1.2 for the message formats):

- First part of the system identification (SID1).
- *Protocol Capability Indicator (PCI)*. Set to '1' if the base station supports IS-54 dual-mode capability.
- *Authentication (AUTH)*. To permit the mobile station to use the authentication procedures described in 2.3.12 and 3.3.1, set this bit to '1'.
- *Serial number (S)*. To require that all mobile stations send their serial numbers during a system access, the S field must be set to '1'; otherwise it must be set to '0'.
- *Registration (REGH, REGR)*. To enable registration for home mobile stations, the REGH field must be set to '1'; otherwise it must be set to '0'. To enable registration for roaming mobile stations, the REGR field must be set to '1'; otherwise it must be set to '0'. If registration is enabled, the base station must support both autonomous and non-autonomous registration by mobile stations.
- *Extended Address (E)*. To require that all mobile stations send both MIN1 and MIN2 during a system access, the E field must be set to '1'; otherwise it must be set to '0'.

- 1 • *Discontinuous transmission (DTX).* To permit mobile stations to use the  
2 discontinuous-transmission mode on the voice channel, the DTX field must be set to  
3 '10' or '11'; otherwise it must be set to '00'. A setting of '10' indicates that the DTX-  
4 low level must equal or exceed a level 8 dB below the DTX-high level. A setting of  
5 '11' indicates that no minimum applies to the DTX-low level (see 2.3.1.1). This field  
6 controls the operation of discontinuous transmission on an analog voice channel  
7 only. All digital traffic channels will support discontinuous transmission as  
8 described in 2.3.1.2.
- 9 • *Number of paging channels (N).*
- 10 • *Read control-filler message (RCF).* To require that all mobile stations read a control-  
11 filler message before accessing a system on a reverse control channel, the RCF field  
12 must be set to '1'; otherwise it must be set to '0'.
- 13 • *Combined paging/access (CPA).* If the access functions are combined with the  
14 paging functions on the same set of control channels, the CPA field must be set to  
15 '1'. If the access functions are not on the same set of channels as the paging  
16 functions, the CPA field must be set to '0'.
- 17 • *Number of access channels (CMAX).*
- 18 The following overhead information is sent as required in messages appended to a System  
19 Parameter Overhead Message (see 3.7.1.2 for messages formats):
- 20 • *CDMA capability.* A system may indicate that it is capable of CDMA operation by  
21 sending the CDMA Capability Global Action Message with the CDMA\_AVAIL field set  
22 to '1'. If CDMA\_AVAIL is set to '1', the base station must set the CDMA\_FREQ field  
23 to the channel number of the CDMA frequency assignment that the mobile station is  
24 to acquire.
- 25 • *Local control.* A system may customize operation for home mobile stations and for  
26 those roaming mobile stations whose home systems are members of a group by  
27 sending local control global action messages.
- 28 • *New Access channels.* If the access channel set is not the default set (see 2.6.2.1),  
29 the New Access Channel Global Action Message must be sent with the NEWACC  
30 field set to the first access channel.
- 31 • *Registration increment.* Each time a mobile station with autonomous registration  
32 enabled registers, it increments its next registration ID by a fixed value (REGINCR<sub>S</sub>;  
33 see 2.6.3.1.1). To change this value, the Registration Increment Global Action  
34 Message must be sent with the REGINCR field appropriately set.
- 35 • *Registration ID.* The registration ID message must be sent in order to require that  
36 all mobile stations with autonomous registration enabled and with a given or lower  
37 next registration ID (NXTREG<sub>S-p</sub>) register.
- 38 • *Rescan.* To require that all mobile stations enter the Initialization Task and scan  
39 the dedicated control channels, the Rescan Global Action Message must be sent.
- 40 • *RAND1\_A.* Used by a mobile station to construct the 16 most significant bits of the  
41 32-bit RAND value.



- 1       • **RAND1\_B**. Used by a mobile station to construct the 16 least significant bits of the  
2       32-bit RAND value.

### 3   3.6.2.2 Page

4   To page a mobile station, a mobile station control message must be sent (see 3.7.1.1). Home  
5   mobile stations may be paged with a one-word or a two-word message. Roaming mobile  
6   stations must be paged with a two-word message.

7   When CPA is set to '0' in a cell's overhead message train, paging for analog or CDMA  
8   mobiles will be performed on the nominal Paging channel.

### 9   3.6.2.3 Order

10   Orders and order confirmations must be sent to mobile stations with a multi-word Mobile  
11   Station Control Message (see 3.7.1.1). The following orders and order confirmations may be  
12   transmitted:

- 13       • Audit
- 14       • Local control.
- 15       • Message Waiting.
- 16       • Abbreviated Alert.
- 17       • SSD Update order.
- 18       • Unique Challenge order.
- 19       • Base Station Challenge order confirmation.

### 20   3.6.2.4 Local Control

21   A cellular system may customize operation for home mobile stations, and for those roaming  
22   mobile stations whose home systems are members of a group, by sending local orders with  
23   the order field set to local control (which informs the mobile station to examine the local  
24   control field), and by sending one or both of two local control global action overhead  
25   messages (see 3.7.1.1, 3.7.1.2.2, and 3.7.2).

26   A group of systems could be formed by participating systems agreeing to a common set of  
27   local control protocols and whose system identifications (SID) are recognized by mobile  
28   stations as a common group.

### 3.6.3 Base Station Support of System Access by Mobile Stations

#### 3.6.3.1 Overhead Information

The following information must be sent on a forward control channel to support system access by mobile stations (see 3.7.1.2 for message formats):

- *Digital color code (DCC)*. The DCC, SDCC1, and SDCC2 are transmitted from the base station to the mobile station. The mobile station then uses the DCC, SDCC1, and SDCC2 to identify to the base station which base station transmitter the mobile station is receiving. If the Supplementary Digital Color Code feature is utilized, the combination of SDCC1 and SDCC2 transmitted by the base station must be a non-zero number. Mobile stations which respond with a non-zero SDCC combination are capable of supporting SDCC. Mobile stations which respond with a zero SDCC combination are not capable of supporting SDCC. The zero SDCC combination is used to indicate either that SDCC1 and SDCC2 are not used or are not supported. To require that mobile stations read a control-filler message containing SDCC1 and SDCC2 prior to system access, the RCF field must be set to '1' in the system parameter overhead message.
- *Control mobile attenuation code (CMAC)*. The CMAC must be transmitted from the base station to the mobile station in the control-filler message if the mobile station must adjust its transmitter power level before accessing a system on a reverse control channel. The translation of the CMAC field to transmitter power level depends on the mobile station's power class as indicated by its station class mark (SCM<sub>p</sub>) (see 2.1.2.2 and 2.3.3). When not required, the CMAC field must be set to '000'. To require that mobile stations read a Control-Filler Message prior to system access, the RCF field must be set to '1' in the System Parameter Overhead Message.
- *Wait-for-overhead-message (WFOM)*. If the mobile station must wait for an overhead message train before accessing a system on a reverse control channel, then the WFOM field must be set to '1' in the Control-Filler Message; otherwise it must be set to '0'.
- *Overload control (OLC)*. If the mobile stations assigned to one or more of the 16 overload classes must not access the system for originations on the reverse control channel, the Overload Control Global Action Message must be appended to a System Parameter Overhead Message. When this message is appended, the overload class fields corresponding to the restricted overload classes must be set to '0', and the remaining overload class fields must be set to '1'.
- *Access type parameters*. If a mobile station must not check for an Idle-to-busy status transition on the reverse control channel when accessing a system, then the Access Type Parameters Global Action Message with the BIS field set to '0' must be appended to a System Parameter Overhead Message; otherwise the BIS field must be set to '1' whenever the message is appended.

- *Access attempt parameters.* If the default values for the number of seizure attempts or the limit on the number of busy occurrences for mobile stations accessing the reverse control channel must not be used, then the Access Attempt Parameters Global Action Message must be appended to a System Parameter Overhead Message.

### 3.6.3.2 Reverse Control Channel Seizure by Mobile Stations

If mobile stations are required to check for an idle-to-busy transition of the busy-idle bits in the corresponding FOCC when accessing a system (i.e., the BIS field is set to '1'), then whenever the base station receives a seizure precursor (see 2.7.1) that matches its encoded form of the DCC with 1 or no bit errors, it must begin transmitting busy-idle bits as busy on the FOCC between 0.8 ms and 2.9 ms, inclusive, after the reception of the last bit of the mobile station's precursor (i.e., bit times 56 through 77 of the mobile station's message). The busy-idle bits must remain busy until the 30 ms after the last bit of the last word of the mobile station's message has been received, if this can be determined; otherwise, until the time equal to  $(24N + 55)$  ms after transmitting the first busy-idle bit as busy, where N is the maximum number of words the base station has been designed to receive.

### 3.6.3.3 Response to Mobile Station Messages

Whenever the mobile station sends a message to the base station, it is not required that the base station respond to the message. During periods of overload or high usage, it may be desirable to permit mobile stations to "time-out" rather than sending release or other orders that use system capacity.

The following responses to mobile station messages may be sent:

- *Origination message.* Send one of the following orders:
  - Initial voice channel designation.
  - Directed retry.
  - Intercept.
  - Reorder.
- *Page response message.* Send one of the following orders:
  - Initial voice channel designation.
  - Directed retry.
  - Release.
- *Order message.* When the base station receives a Base Station Challenge Order from the mobile station, it should perform the authentication procedure as defined in 2.3.12.1.8. The base must then send the order confirmation to the mobile containing the algorithm output. For all other orders, the base station should send one of the following orders:
  - Order confirmation.
  - Release.

- *Order confirmation message.* No message is sent.

#### 3.6.4 Mobile Station Control on Voice Channel

Whenever the mobile station is transmitting on a voice channel, changes in the status of the supervisory audio tone (SAT) and signaling tone (ST) are used to signal the occurrence of certain events during the progress of a call. These events include confirming orders, sending a release request, sending a flash request, and loss of radio-link continuity. The mobile station will signal these events by changing in a prescribed manner (see 2.6.4) the status of the SAT and ST, abbreviated in the following sections (SAT,ST) where SAT and ST have the value '0' when not present and '1' when present. These status changes must be detected by the base station and interpreted within the context of the task the base station is in as a message that identifies the event signaled by the mobile station. Requirements concerning these base station actions are described below. In the following sections, the (0,1) status shall always be treated as the (0,0) status.

In addition to the analog signaling to and from the mobile station, digital messages can be sent to the mobile station and received from the mobile station. The response to a digital message sent to the mobile station will be either be a digital message or a status change of SAT and ST.

##### 3.6.4.1 Loss of Radio-Link Continuity

Reserved.

##### 3.6.4.2 Initial Voice Channel Confirmation

Confirmation that a mobile station has successfully tuned to its initial designated voice channel will be received by the base station as a change in the SAT, ST status from (0,0) to (1,0).

If the confirmation is not received, the base station must either resend the message or turn off the voice channel transmitter.

Following confirmation, if the mobile station was paged, the base station must enter the Waiting for Order Task (see 3.6.4.3.1); otherwise, the base station must enter the Conversation Task (see 3.6.4.4).

##### 3.6.4.3 Alerting

###### 3.6.4.3.1 Waiting for Order

When the mobile station confirms the initial voice channel designation after having been paged, it enters this task. The following orders can be sent to the mobile station, with the resultant confirmation and action to be taken as follows:

- *Handoff (to Analog Voice Channel).* The mobile station confirms the order by a change in the SAT, ST status from (1,0) to (1,1) with the (1,1) status held for 50 ms. The base station must remain in the Waiting for Order Task.
- *Handoff (to Digital Traffic Channel).* Requires further study.

- 1     • *Alert or Alert with Info.* The mobile station confirms the order by a change in the  
2       SAT, ST status from (1,0) to (1,1). The base station must then enter the Waiting for  
3       Answer Task (see 3.6.4.3.2).
- 4     • *Alert with Info SMS.* Within 750 ms, the mobile station confirms the order by  
5       sending an Alert With Info SMS Order Confirmation message. The SEQ\_NO received  
6       in the Alert With Info SMS Order Confirmation message, SEQ\_NO<sub>r</sub>, is compared to  
7       the SEQ\_NO transmitted in the last Alert With Info SMS message, SEQ\_NO<sub>s</sub>. If the  
8       comparison results in a match, the base station may transmit the next pending  
9       Alert With Info SMS message. If the comparison results in a mismatch, the base  
10      station must not transmit any new Alert With Info SMS messages and may re-  
11      transmit the unacknowledged Alert With Info SMS message until that outstanding  
12      Alert With Info SMS message is received as indicated by a match of SEQ\_NO<sub>r</sub> and  
13      SEQ\_NO<sub>s</sub>. Then, if the channel was allocated to deliver SMS messages, the base  
14      station should send a Release order. Otherwise the base station must remain in the  
15      Waiting for Order Task.
- 16    • *Release.* The mobile station confirms the order by a change of the SAT, ST status  
17      from (1,0) to (1,1) with the (1,1) status held for 1.8 seconds. The base station must  
18      then turn off the transmitter.
- 19    • *Audit.* The mobile station confirms the order by a digital message (see 2.7.2). The  
20      base station must remain in the Waiting for Order Task.
- 21    • *Message Waiting.* The mobile station confirms the order by a digital message (see  
22      2.7.2). The base station must remain in the Waiting for Order Task.
- 23    • *Maintenance.* The mobile station confirms the order by a change in the SAT, ST  
24      status from (1,0) to (1,1). The base station must then enter the Waiting for Answer  
25      Task (see 3.6.4.3.2).
- 26    • *Change power.* The mobile station confirms the order by a digital message (see  
27      2.7.2). The base station must remain in the Waiting for Order Task.
- 28    • *Serial Number Request.* The mobile station confirms the order by a Serial Number  
29      Response Message. The base station must remain in the Waiting for Order Task.
- 30    • *Page.* The mobile station confirms the order by a Page Response Message with the  
31      preferred call mode in the message type field. The base station must remain in the  
32      Waiting for Order Task.
- 33    • *SSD Update Order:* The mobile station computes SSD-A\_NEW and SSD-B\_NEW and  
34      selects a RANDBS as described in 2.3.12.1.8. Within 750 ms, mobile stations  
35      conforming to this specification will begin transmitting a Base Station Challenge  
36      Order (mobile stations conforming to other standards may take up to 5 seconds).  
37      Process the order as described below and remain in the Waiting for Order Task.
- 38    • *Unique Challenge Order.* The mobile executes the Unique Challenge Response  
39      Procedure (see 2.3.12.1.5) and within 750 ms, mobile stations conforming to this  
40      specification will begin transmitting a confirmation containing the output of the  
41      Authentication Process (mobile stations conforming to other standards may take up  
42      to 5 seconds). The base station must remain in the Waiting for Order Task.

- 1 • *Parameter Update Order.* The mobile station executes the parameter updating  
2 procedure (see 2.3.12.1.3 and 2.3.12.1.7) and confirms the order by sending a  
3 Parameter Update Confirmation. The base station must remain in the Waiting for  
4 Order Task.
- 5 • *Message Encryption Mode Order.* The mobile station enables or disables the  
6 message encryption mode as indicated in the order (see 2.3.12.2.1) and confirms the  
7 order with a digital message (see 2.7.2). The base station must remain in the  
8 Waiting for Order Task.
- 9 • *Local control.* The confirmation and action depend on the message.

10 In addition, the following messages can be received autonomously from the mobile station:

- 11 • *Page Response:* The IS-54 compatible dual-mode mobile station signals a change in  
12 preferred call mode or privacy mode by transmitting a Page Response Message with  
13 the order qualifier and message type field indicating the combination of preferred  
14 call mode and privacy mode. The base station shall remain in the Waiting for Order  
15 Task.
- 16 • *Base Station Challenge Order:* When the base station receives a Base Station  
17 Challenge Order it must process the RANDBS contained in the order as described in  
18 2.3.12.1.8, and within 10 seconds, send the result (AUTHBS) back to the mobile  
19 station in the associated order confirmation. The base station shall remain in the  
20 Waiting for Order Task.

#### 21 3.6.4.3.2 Waiting for Answer

22 When this task is entered, an alert timer may be set. The following orders can be sent with  
23 the confirmation and action to be taken as follows:

- 24 • *Handoff (to Analog Voice Channel).* The mobile station confirms the order by  
25 changing the SAT, ST status from (1,1) to (1,0) for 500 ms followed by a change in  
26 the status from (1,0) to (1,1), with the (1,1) status held for 50 ms on the old channel.  
27 Then a (1,1) status is sent on the new channel. The base station must remain in the  
28 Waiting for Answer Task.
- 29 • *Handoff (to Digital Traffic Channel).* Requires further study.
- 30 • *Alert or Alert with Info.* No Confirmation is received. The base station may reset the  
31 alert timer and remain in the Waiting for Answer Task.

- 1 • *Alert with Info SMS.* Within 750 ms, the mobile station confirms the order by  
2 sending an Alert With Info SMS Order Confirmation message. The SEQ\_NO received  
3 in the Alert With Info SMS Order Confirmation message, SEQ\_NO<sub>r</sub>, is compared to  
4 the SEQ\_NO transmitted in the last Alert With Info SMS message, SEQ\_NO<sub>s</sub>. If the  
5 comparison results in a match, the base station may transmit the next pending  
6 Alert With Info SMS message. If the comparison results in a mismatch, the base  
7 station must not transmit any new Alert With Info SMS messages and may re-  
8 transmit the unacknowledged Alert With Info SMS message until that outstanding  
9 Alert With Info SMS message is received as indicated by a match of SEQ\_NO<sub>r</sub> and  
10 SEQ\_NO<sub>s</sub>. Then, if the channel was allocated to deliver SMS messages, the base  
11 station should send a Release order. Otherwise the base station must remain in the  
12 Waiting for Answer Task.
- 13 • *Stop alert.* The mobile station confirms the order by a change in the SAT, ST status  
14 from (1,1) to (1,0). The base station must then enter the Waiting for Order Task.
- 15 • *Release.* The mobile station confirms the order by a change in the SAT, ST status  
16 from (1,1) to (1,0) for 500 ms followed by a change in the status from (1,0) to (1,1),  
17 with the (1,1) status held for 1.8 seconds. The base station must then turn off the  
18 transmitter.
- 19 • *Audit.* The mobile station confirms the order by a digital message (see 2.7.2). The  
20 base station must remain in the Waiting for Answer Task.
- 21 • *Flash with Info.* The mobile station confirms the order by a digital message (see  
22 2.7.2). The base station must remain in the Waiting for Answer Task.
- 23 • *Message Waiting:* The mobile station confirms the order by a digital message (see  
24 2.7.2). The base station must remain in the Waiting for Answer Task.
- 25 • *Maintenance.* No confirmation is received. The base station may reset the alert  
26 timer and remain in the Waiting for Answer Task.
- 27 • *Change power.* The mobile station confirms the order by a digital message (see  
28 2.7.2). The base station must remain in the Waiting for Answer Task.
- 29 • *Serial Number Request.* The mobile station confirms the order by a Serial Number  
30 Response Message. The base station must remain in the Waiting for Answer Task.
- 31 • *Page.* The mobile station confirms the order by a Page Response Message with a  
32 preferred call mode indicated in the message type field. The base station must  
33 remain in the Waiting for Answer Task.
- 34 • *SSD Update Order:* The mobile station computes SSD-A\_NEW and SSD-B\_NEW and  
35 selects a RANDBS as described in 2.3.12.1.8. Within 750 ms, mobile stations  
36 conforming to this specification will begin transmitting a Base Station Challenge  
37 Order (mobile stations conforming to other standards may take up to 5 seconds).  
38 Process the order as described below and remain in the Waiting for Answer Task.

- 1 • *Unique Challenge Order.* The mobile executes the Unique Challenge Response  
2 Procedure (see 2.3.12.1.5) and within 750 ms, mobile stations conforming to this  
3 specification will begin transmitting a confirmation containing the output of the  
4 Authentication Process (mobile stations conforming to other standards may take up  
5 to 5 seconds). The base station must remain in the Waiting for Answer Task.
- 6 • *Parameter Update Order.* The mobile station executes the parameter updating  
7 procedure (see 2.3.12.1.3 and 2.3.12.1.7) and confirms the order by sending a  
8 Parameter Update Confirmation. The base station must remain in the Waiting for  
9 Answer Task.
- 10 • *Message Encryption Mode Order.* The mobile station enables or disables the  
11 message encryption mode as indicated in the order (see 2.3.12.2.1) and confirms the  
12 order with a digital message (see 2.7.2). The base station must remain in the  
13 Waiting for Answer Task.
- 14 • *Local control.* The confirmation and action depend on the message.

15 In addition, the following messages can be received autonomously from the mobile station:

- 16 • *Page Response:* The IS-54 compatible dual-mode mobile station signals a change in  
17 preferred call mode or privacy mode by transmitting a Page Response message with  
18 the order qualifier and message type field indicating the combination of preferred  
19 call mode and privacy mode. The base station shall remain in the Waiting for  
20 Answer Task.
- 21 • *Base Station Challenge Order:* When the base station receives a Base Station  
22 Challenge Order it must process the RANDBS contained in the order as described in  
23 2.3.12.1.8, and within 10 seconds, send the result (AUTHBS) back to the mobile  
24 station in the associated order confirmation. The base station shall remain in the  
25 Waiting for Answer Task.

26 The mobile station signals an answer by a change in the SAT, ST status from (1,1) to (1,0).  
27 The base station must then enter the Conversation Task (see 3.6.4.4).

#### 28 3.6.4.4 Conversation

29 While the base station is in the Conversation Task, the following orders can be sent to the  
30 mobile station, with confirmation and action to be taken as follows:

- 31 • *Handoff (to Analog Voice Channel).* The mobile station confirms the order by a  
32 change in the SAT, ST status from (1,0) to (1,1), with the (1,1) status held for 50 ms.  
33 The base station must remain in the Conversation Task.
- 34 • *Handoff (to Digital Traffic Channel).* Requires further study.
- 35 • *Send called address.* The mobile station confirms the order by a digital message  
36 with the called-address information (see 2.7.2). The action to be taken will depend  
37 on the called-address information.
- 38 • *Alert Alert with Info.* The mobile station confirms the order by a change in the SAT,  
39 ST status from (1,0) to (1,1). The base station must then enter the Waiting for  
40 Answer Task (see 3.6.4.3.2).



- 1     • *Alert with Info SMS.* Within 750 ms, the mobile station confirms the order by  
2     sending an Alert With Info SMS Order Confirmation message. The SEQ\_NO received  
3     in the Alert With Info SMS Order Confirmation message, SEQ\_NO<sub>r</sub>, is compared to  
4     the SEQ\_NO transmitted in the last Alert With Info SMS message, SEQ\_NO<sub>s</sub>. If the  
5     comparison results in a match, the base station may transmit the next pending  
6     Alert With Info SMS message. If the comparison results in a mismatch, the base  
7     station must not transmit any new Alert With Info SMS messages and may re-  
8     transmit the unacknowledged Alert With Info SMS message until that outstanding  
9     Alert With Info SMS message is received as indicated by a match of SEQ\_NO<sub>r</sub> and  
10    SEQ\_NO<sub>s</sub>. The base station must remain in the Conversation Task.
- 11    • *Release.* The mobile station confirms the order by a change in the SAT, ST status  
12    from (1,0) to (1,1), with the (1,1) status held for 1.8 seconds. The base station must  
13    turn off the transmitter.
- 14    • *Audit.* The mobile station confirms the order by a digital message (see 2.7.2). The  
15    base station must remain in the Conversation Task.
- 16    • *Flash with Info.* The mobile station confirms the order with a digital message (see  
17    2.7.2). The base station must remain in the Conversation Task.
- 18    • *Message Waiting.* The mobile station confirms the order by a digital message (see  
19    2.7.2). The base station must remain in the Conversation Task.
- 20    • *Maintenance.* The mobile station confirms the order by a change in the SAT, ST  
21    status from (1,0) to (1,1). The base station must then enter the Waiting for Answer  
22    Task (see 3.6.4.3.2).
- 23    • *Change power.* The mobile station confirms the order by a digital message (see  
24    2.7.2). The base station must remain in the Conversation Task.
- 25    • *Serial Number Request.* The mobile station confirms the order by a Serial Number  
26    Response message. The base station must remain in the Conversation Task.
- 27    • *Page.* The mobile station confirms the order by a Page Response Message with the  
28    preferred call mode indicated in the message type field. The base station must  
29    remain in the Conversation Task.
- 30    • *SSD Update Order.* The mobile station computes SSD-A\_NEW and SSD-B\_NEW and  
31    selects a RANDBS as described in 2.3.12.1.8. Within 750 ms, mobile stations  
32    conforming to this specification will begin transmitting a Base Station Challenge  
33    Order (mobile stations conforming to other standards may take up to 5 seconds).  
34    Process the order as described below and remain in the Conversation Task.
- 35    • *Unique Challenge Order.* The mobile executes the Unique Challenge Response  
36    Procedure (see 2.3.12.1.5) and within 750 ms, mobile stations conforming to this  
37    specification will begin transmitting a confirmation containing the output of the  
38    Authentication Process (mobile stations conforming to other standards may take up  
39    to 5 seconds). The base station must remain in the Conversation Task.

- 1     • *Parameter Update Order.* The mobile station executes the parameter updating  
2     procedure (see 2.3.12.1.3 and 2.3.12.1.7) and confirms the order by sending a  
3     Parameter Update Confirmation. The base station must remain in the Conversation  
4     Task.
- 5     • *Disable DTMF Order.* The mobile station confirms the order by a digital message  
6     (see 2.7.2). The mobile disables the DTMF tone generator upon receipt of this order  
7     until the Called Address Message is transmitted. The base station must remain in  
8     the Conversation Task.
- 9     • *Message Encryption Mode Order.* The mobile station enables or disables the  
10    message encryption mode as indicated in the order (see 2.3.12.2.1) and confirms the  
11    order with a digital message (see 2.7.2). The base station must remain in the  
12    Conversation Task.
- 13    • *Local control.* The confirmation and action depend on the message.

14   In addition, the following messages can be received autonomously from the mobile station:

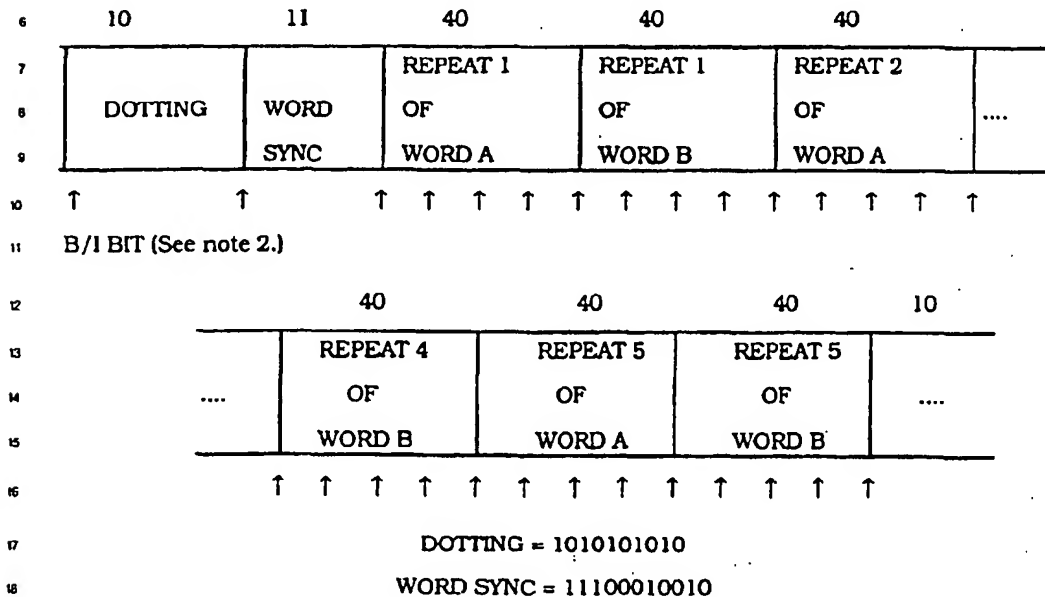
- 15   • *Flash request.* The mobile station signals a flash by a change in the SAT, ST status  
16   from (1,0) to (1,1) with the (1,1) status held for 400 ms followed by a transition to  
17   the (1,0) status.
- 18   • *Release.* The mobile station signals a release by a change in the SAT, ST status  
19   from (1,0) to (1,1) with the (1,1) status held for 1.8 seconds. The base station must  
20   turn off the transmitter.
- 21   • *Page Response:* The IS-54 compatible dual-mode mobile station signals a change in  
22   preferred call mode or privacy mode by transmitting a Page Response Message with  
23   the order qualifier and message type field indicating the combination of preferred  
24   call mode and privacy mode. The base station shall remain in the Conversation  
25   Task.
- 26   • *Base Station Challenge Order:* When the base station receives a Base Station  
27   Challenge Order it must process the RANDBS contained in the order as described in  
28   2.3.12.1.8, and within 10 seconds, send the result (AUTHBS) back to the mobile  
29   station in the associated order confirmation. The base station shall remain in the  
30   Conversation Task.

### 31   3.7 Signaling Formats

32   In the message formats used between the mobile stations and base stations, some bits are  
33   marked as reserved (RSVD). Some or all of these reserved bits may be used in the future  
34   for additional messages. Therefore, all mobile stations and base stations must set all bits  
35   that they are programmed to treat as reserved bits to '0' (zero) in all messages that they  
36   transmit. All mobile stations and base stations must ignore the state of all bits that they  
37   are programmed to treat as reserved bits in all messages that they receive.

### 3.7.1 Forward Analog Control Channel

The forward analog control channel (FOCC) is a continuous wideband data stream sent from the base station to the mobile station. This data stream must be generated at a 10 kbps  $\pm 0.1$  bps rate. Figure 3.7.1-1 depicts the format of the FOCC data stream.



#### NOTES:

1. A given mobile reads only one of the two interleaved messages (A or B).
2. Busy-Idle bits are inserted at each arrow.

**Figure 3.7.1-1. Forward Analog Control Channel Message Stream (Base-to-Mobile)**

Each forward analog control channel consists of three discrete information streams, called stream A, stream B, and busy-idle stream, that are time-multiplexed together. Messages to mobile stations with the least significant bit of their mobile identification number (see 2.3.1) equal to '0' are sent on stream A, and those with the least-significant bit of their mobile identification number equal to '1' are sent on stream B.

The busy-idle stream contains busy-idle bits, which are used to indicate the current status of the reverse control channel. The reverse control channel is busy if the busy-idle bit is equal to '0' and idle if the busy-idle bit is equal to '1'. A busy-idle bit is located at the beginning of each dotting sequence, at the beginning of each word sync sequence, at the beginning of the first repeat of word A, and after every 10 message bits thereafter.

1 A 10-bit dotting sequence (1010101010) and an 11-bit word sync sequence (11100010010)  
 2 are sent to permit mobile stations to achieve synchronization with the incoming data. Each  
 3 word contains 40 bits, including parity, and is repeated five times; it is then referred to as a  
 4 word block. For a multi-word message, the second word block and subsequent word blocks  
 5 are formed the same as the first word block including the 10-bit dotting and 11-bit word  
 6 sync sequences. A word is formed by encoding 28 content bits into a (40, 28) BCH code  
 7 that has a distance of 5, (40, 28; 5). The left-most bit (i.e., earliest in time) shall be  
 8 designated the most-significant bit. The 28 most-significant bits of the 40-bit field shall be  
 9 the content bits. The generator polynomial for the (40, 28; 5) BCH code is:

$$10 \quad g_B(x) = X^{12} + X^{10} + X^8 + X^5 + X^4 + X^3 + X^0.$$

11 The code, a shortened version of the primitive (63, 51; 5) BCH code, is a systematic linear  
 12 block code with the leading bit as the most significant information bit and the least-  
 13 significant bit as the last parity-check bit.

14 Each FOCC message can consist of one or more words. The types of messages to be  
 15 transmitted over the forward control channel are:

- 16 • Mobile Station Control Message.
- 17 • Overhead Message.
- 18 • Control-Filler Message.

19 Control-filler messages may be inserted between messages and between word blocks of a  
 20 multi-word message.

21 The following sections contain descriptions of the message formats that the base station  
 22 transmits over either stream A or B. For purposes of format presentation and explanation,  
 23 the busy-idle bits have been deleted in the discussion of the message formats.

#### 24 3.7.1.1 Mobile Station Control Message

25 The Mobile Station Control Message can consist of one to five words.

26 Word 1 - Abbreviated Address Word

Information Element	Length (bits)
T <sub>1</sub> T <sub>2</sub>	2
DCC	2
MIN <sub>123-0</sub>	24
P	12

27

1 Word 2 - Extended Address Word

Information Element		Length (bits)	
$T_1 T_2 = 10$		2	
SCC		2	
SCC = 11		SCC $\neq$ 11	
Information Element	Length (bits)	Information Element	Length (bits)
MIN <sub>233-24</sub>	10	MIN <sub>233-24</sub>	10
EF=0	1	VMAC	3
LOCAL/MSG_TYPE	5	CHAN	11
ORDQ	3	P	12
ORDER	5		
P	12		

2

3 Word 3 - First Directed-Retry Word

Information Element	Length (bits)
$T_1 T_2 = 10$	2
SCC = 11	2
CHANPOS	7
CHANPOS	7
CHANPOS	7
RSVD = 000	3
P	12

4

5 Word 3 - Base Station Challenge Order Confirmation Word

Information Element	Length (bits)
$T_1 T_2 = 10$	2
SCC = 11	2
RSVD = 00	2
AUTHBS	18
RSVD = 0000	4
P	12

6

## 1 Word 3 - Unique Challenge Order Word

Information Element	Length (bits)
$T_1 T_2 = 10$	2
SCC = 11	2
RANDU	24
P	12

2

## 3 Word 3 - First SSD Update Order Word

Information Element	Length (bits)
$T_1 T_2 = 10$	2
SCC = 11	2
RANDSSD_1	24
P	12

4

## 5 Word 4 - Second Directed-Retry Word

Information Element	Length (bits)
$T_1 T_2 = 10$	2
SCC = 11	2
CHANPOS	7
CHANPOS	7
CHANPOS	7
RSVD = 000	3
P	12

6

## 7 Word 4 - Second SSD Update Order Word

Information Element	Length (bits)
$T_1 T_2 = 10$	2
SCC = 11	2
RANDSSD_2	24
P	12

8

1 Word 5 - Third SSD Update Order Word

Information Element	Length (bits)
$T_1T_2 = 10$	2
SCC = 11	2
RSVD = 0..0	12
RANDSSD_3	8
RSVD = 0000	4
P	12

2

3 The interpretation of the data fields is as follows:

4  $T_1T_2$  - Type field. If only Word 1 is sent, set to '00' in Word 1. If a multiple-  
5 word message is sent, set to '01' in Word 1 and set to '10' in each  
6 additional word.

7 DCC - Digital color code field.

8 EF - Extended Protocol (Forward Channel) Indicator (see 5.2);

9 MSG\_TYPE - Message type field. Qualifies the order to a specific action (see  
10 Table 3.7.1.1-1).

11 MIN1 - First part of the mobile identification number field (see 2.3.1).

12 MIN2 - Second part of the mobile identification number field (see 2.3.1).

13 SCC - SAT color code (see Table 3.7.1.1-2).

14 ORDER - Order field. Identifies the order type (see Table 3.7.1.1-1).

15 ORDQ - Order qualifier field. Qualifies the order to a specific action (see  
16 Table 3.7.1.1-1).

17 LOCAL - Local control field. This field is specific to each system. The ORDER field  
18 must be set to local control (see Table 3.7.1.1-1) for this field to be  
19 interpreted.

20 VMAC - Voice mobile attenuation code field. Indicates the mobile station power  
21 level associated with the designated analog voice channel. VMAC is made  
22 of the three least significant bits of MAC in Table 2.1.2.2-1.

23 CHAN - Channel number field. Indicates the designated RF channel (see 2.1.1.1  
24 and 2.3.3).

25 CHANPOS - Channel position field. Indicates the position of a control channel relative  
26 to the first access channel (FIRSTCHA).

27 RANDU - The 24-bit random number issued by the base in the Unique Challenge  
28 Order.

- 1    **RANDSSD\_1** - The most significant 24 bits of the random number issued by the base in
- 2                    the SSD Update Order.
- 3    **RANDSSD\_2** - The subsequent 24 bits (following **RANDSSD\_1**) of the random number
- 4                    issued by the base in the SSD Update Order.
- 5    **RANDSSD\_3** - The least significant 8 bits of the random number issued by the base in
- 6                    the SSD Update Order.
- 7            **AUTHBS** - Output response of the authentication algorithm initiated by the Base
- 8                    Station Challenge Order.
- 9            **RSVD** - Reserved for future use, all bits must be set as indicated.
- 10           **P** - Parity field.



Table 3.7.1.1-1. Order and Order Qualification Codes

Order Code	Qual Code	Message Type	Function
00001	000	00000	Alert
00001	001	00000	Abbreviated Alert
10001	000	00000	Alert With Info
10001	000	00001	Alert With Info SMS
10010	000	00000	Flash With Info
00011	000	00000	Release
00100	000	00000	Reorder
00101	000	XXXXX	Message Waiting (Type field indicates # of messages)
00110	000	00000	Stop Alert
00111	000	00000	Audit
01000	000	00000	Send Called-address
01001	000	00000	Intercept
01010	000	00000	Maintenance
01011	000	00000	Change Power to Power Level 0 (see 2.1.2.2)
01011	001	00000	Change Power to Power Level 1
01011	010	00000	Change Power to Power Level 2
01011	011	00000	Change Power to Power Level 3
01011	100	00000	Change Power to Power Level 4
01011	101	00000	Change Power to Power Level 5
01011	110	00000	Change Power to Power Level 6
01011	111	00000	Change Power to Power Level 7
01100	000	00000	Directed Retry - not last try
01100	000	00001	Directed Retry to Dedicated Control Channels - authentication disabled, not last try
01100	000	00010	Directed Retry to Dedicated Control Channels - authentication enabled, not last try
01100	001	00000	Directed Retry - last try
01100	001	00001	Directed Retry to Dedicated Control Channels - authentication disabled, last try
01100	001	00010	Directed Retry to Dedicated Control Channels - authentication enabled, last try

Table 3.7.1.1-1. (Cont) Order, Order Qualification, and Message Type Codes

Order Code	Qual Code	Message Type	Function
01101	000	00000	Reserved
01101	001	00000	Reserved
01101	010	00000	Autonomous Registration - Do not make whereabouts known, Authentication Word C not included
01101	011	00000	Autonomous Registration - Make whereabouts known, Authentication Word C not included
01101	011	00001	Autonomous Registration - Power Down, Authentication Word C not included
11000	000	00000	Reserved
11000	001	00000	Reserved
11000	010	00000	Autonomous Registration - Do not make whereabouts known, Authentication Word C included
11000	011	00000	Autonomous Registration - Make whereabouts known, Authentication Word C included
11000	011	00001	Autonomous Registration - Power Down, Authentication Word C included
11110	000	XXXXX	local control
01111	000	00000	Parameter Update Order/Confirmation
01111	001	00000	Serial Number Request/Response
[Base station initiated messages only - Page message]			
00000	000	00000	Page Message
[Mobile station initiated messages only - Origination and Page Response messages]			
00000	000	00000	Authentication Word C not included
00010	000	00000	Authentication Word C included

Table 3.7.1.1-1. (Cont) Order, Order Qualification, and Message Type Codes

Order Code	Qual Code	Message Type	Function
[Base station initiated messages only - Mobile Station Authentication and Privacy]			
10011	000	00000	Base Station Challenge Order Confirmation
10100	000	00000	Unique Challenge Order
10101	000	00000	SSD Update Order
10110	000	00000	Disable DTMF Order
10111	000	00000	Message Encryption Mode Order with disable indication
10111	001	00000	Message Encryption Mode Order with enable indication
[Mobile station initiated messages only - Mobile Station Authentication and Privacy]			
10011	000	00000	Base Station Challenge Order
10100	000	00000	Unique Challenge Order Confirmation
10101	000	00000	SSD Update Order Confirmation with failure indication
10101	001	00000	SSD Update Order Confirmation with success indication
[Base station initiated messages only Reserved for use by EIA/TIA-IS-54 compatible base stations]			
10000	000	XXXXX	Call Mode Ack
10000	100	XXXXX	Call Mode Ack
10000	001	XXXXX	Call Mode Ack
01110	000	XXXXX	Initial Traffic Channel Designation
01110	001	XXXXX	Initial Traffic Channel Designation
[Mobile station initiated messages only Reserved for use by EIA/TIA-IS-54 compatible mobile stations]			
000X0	000	Note 1	Origination and Page Response
000X0	001	XXXXX	Origination and Page Response
000X0	100	XXXXX	Origination and Page Response
(All other codes are reserved)			

Note 1: All message type codes except for '00000' are reserved for use by EIA/TIA-IS-54 compatible mobile stations.

Note 2: When a mobile station sends the Autonomous Registration message on the Reverse Voice Channel as a result of being powered down, the mobile station shall use the order code '01101'.

**Table 3.7.1.1-2. SAT Color Code (SCC)**

Bit Pattern	SAT Frequency
00	5970 Hz
01	6000 Hz
10	6030 Hz
11	(Not an analog channel designation)

**3.7.1.2 Overhead Message**

A three-bit OHD field is used to identify the overhead message types. Overhead message type codes are listed in Table 3.7.1.2-1, and are grouped into the following functional classes:

- System Parameter Overhead Message,
- Global Action Overhead Message,
- Registration Identification Message,
- Control-Filler Message.

Overhead messages are sent in a group called an overhead message train. The first message of the train must be the System Parameter Overhead Message. The desired global action messages or a Registration ID Message must be appended to the end of the System Parameter Overhead Message. The total number of words in an overhead message train is one more than the value of the NAWC field contained in the first word of the System Parameter Overhead Message. The last word in the overhead message train is identified by a '1' in the END field of that word; the END field of all other words in the train must be set to '0'. For NAWC-counting purposes, inserted control-filler messages (see 3.7.1) must not be counted as part of the overhead message train.

The System Parameter Overhead Message must be sent every  $0.8 \pm 0.3$  seconds on each of the following control channels:

- All dedicated control channels (see 2.6.1.1.1).
- Combined paging-access forward control channel (i.e., CPA = 1, see 3.7.1.2.1),
- Separate paging forward control channel (i.e., CPA = 0),
- Separate access forward control channel (i.e., CPA = 0) when the control-filler message is sent with the WFOM bit set to '1' (see 3.7.1.2.4).

The global action messages and the Registration Identification Message are sent on an as needed basis.

Table 3.7.1.2-1. Overhead Message Types

Code	Order
000	Registration ID
001	Control-filler
010	Reserved
011	Reserved
100	Global action
101	Reserved
110	Word 1 of system parameter message
111	Word 2 of system parameter message

## 3.7.1.2.1 System Parameter Overhead Message

The System Parameter Overhead Message consists of two words.

Word 1

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
SID1	14
EP	1
AUTH	1
PCI	1
NAWC	4
OHD = 110	3
P	12

## Word 2

Information Element	Length (bits)
$T_1T_2 = 11$	2
DCC	2
S	1
E	1
REGH	1
REGR	1
DTX	2
N - 1	5
RCF	1
CPA	1
CMAx - 1	7
END	1
OHD = 111	3
P	12

The interpretation of the data fields is as follows:

- $T_1T_2$  - Type field. Set to '11' indicating an overhead word.
- OHD - Overhead message type field. The OHD field of word 1 is set to '110' indicating the first word of the system parameter overhead message. The OHD field of word 2 is set to '111' indicating the second word of the system parameter overhead message.
- EP - Extended Protocol Capability Indicator. The base station shall set EP = '0' except when implementing the optional procedures in Section 5 (see 5.2).
- DCC - Digital color code field.
- SID1 - First part of the system identification field.
- AUTH - Set to '1' if the base station supports the authentication procedures described in sections 2.3.12 and 3.3.1.
- PCI - Set to '1' if the base station supports IS-54 dual-mode capability.
- NAWC - Number of additional words coming field. In word 1 this field is set to one fewer than the total number of words in the overhead message train.
- S - Serial number field.
- E - Extended address field.

- 1 REGH - Registration field for home stations.
- 2 REGR - Registration field for roaming stations.
- 3 DTX - Discontinuous transmission field.
- 4 N-1 - N is the number of paging channels in the system.
- 5 RCF - Read-control-filler field.
- 6 CPA - Combined paging/access field.
- 7 CMAX-1 - CMAX is the number of access channels in the system.
- 8 END - End indication field. Set to '1' to indicate the last word of the overhead
- 9 message train; set to '0' if not last word.
- 10 RSVD - Reserved for future use, all bits must be set as indicated.
- 11 P - Parity field.

#### 12 3.7.1.2.2 Global Action Overhead Message

13 Each Global Action Overhead Message consists of one word. The global action message  
 14 types are listed in Table 3.7.1.2.3-1. Any number of global action messages can be  
 15 appended to a System Parameter Overhead Message.

16 The formats for the global action commands are as follows:

#### 17 Rescan Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 0001	4
RSVD = 000 ... 000	16
END	1
OHD = 100	3
P	12

18

## 1 Registration Increment Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 0010	4
REGINCR	12
RSVD = 0000	4
END	1
OHD = 100	3
P	12

2

## 3 New Access Channel Set Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 0110	4
NEWACC	11
RSVD = 00000	5
END	1
OHD = 100	3
P	12

4



## 1 Location Area Global Action Message

Information Element	Length (bits)
$T_1T_2 = 11$	2
DCC	2
ACT = 0011	4
PUREG	1
PDREG	1
LREG	1
RSVD = 0	1
LOCAID	12
END	1
OHD = 100	3
P	12

2

## 3 CDMA Capability Global Action Message

Information Element	Length (bits)
$T_1T_2 = 11$	2
DCC	2
ACT = 0100	4
CDMA_FREQ	11
CDMA_AVAIL	1
RSVD = 0000	4
END	1
OHD = 100	3
P	12

4

## 1 Overload Control Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 1000	4
OLC 0	1
OLC 1	1
OLC 2	1
OLC 3	1
OLC 4	1
OLC 5	1
OLC 6	1
OLC 7	1
OLC 8	1
OLC 9	1
OLC 10	1
OLC 11	1
OLC 12	1
OLC 13	1
OLC 14	1
OLC 15	1
END	1
OHD = 100	3
P	12

## 1 Access Type Parameters Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 1001	4
BIS	1
RSVD = 000 ... 000	15
END	1
OHD = 100	3
P	12

2

## 3 Access Attempt Parameters Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 1010	4
MAXBUSY-PGR	4
MAXSZTR-PGR	4
MAXBUSY-OTHER	4
MAXSZTR-OTHER	4
END	1
OHD = 100	3
P	12

4

## 1 Random Challenge A Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 0111	4
RAND1_A	16
END	1
OHD = 100	3
P	12

2

## 3 Random Challenge B Global Action Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 1011	4
RAND1_B	16
END	1
OHD = 100	3
P	12

4

## 5 Local Control 1 Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 1110	4
LOCAL CONTROL	16
END	1
OHD = 100	3
P	12

6

## 1 Local Control 2 Message

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
ACT = 1111	4
LOCAL CONTROL	16
END	1
OHD = 100	3
P	12

2

3 The interpretation of the data fields is as follows:

- 4  $T_1 T_2$  - Type field. Set to '11' indicating an overhead word.
- 5 ACT - Global action field. See Table 3.7.1.2.3-1.
- 6 BIS - Busy-idle status field.
- 7 DCC - Digital color code field.
- 8 OHD - Overhead message type field. Set to '100' indicating the global  
9 action message.
- 10 CDMA\_FREQ - Channel number of the CDMA frequency assignment to acquire.
- 11 CDMA\_AVAIL - Set to '1' if CDMA is available.
- 12 REGINCR - Registration increment field.
- 13 NEWACC - New access channel starting point field.
- 14 MAXBUSY-PGR - Maximum busy occurrences field (page response).
- 15 MAXBUSY-OTHER - Maximum busy occurrences field (other accesses).
- 16 MAXSZTR-PGR - Maximum seizure tries field (page response).
- 17 MAXSZTR-OTHER - Maximum seizure tries field (other accesses).
- 18 OLC N - Overload class field (N = 0 to 15). (See NOTE for  
19 recommended overload control bit assignments.)
- 20 END - End indication field. Set to '1' to indicate the last word of the  
21 overhead message train; set to '0' if not last word.
- 22 RAND1\_A - The 16 most significant bits of the 32-bit RAND variable  
23 stored by a mobile for use in the authentication process.
- 24 RAND1\_B - The 16 least significant bits of the 32-bit RAND variable stored  
25 by a mobile for use in the authentication process.
- 26 LOCAID - Location area identity field.

27

- 1                   RSVD - Reserved for future use, all bits must be set as indicated.
- 2           LOCAL CONTROL - May be set to any bit pattern.
- 3                   PUREG - Power up registration status field (enabled = 1, disabled = 0).
- 4                   PDREG - Power down registration Status field (enabled = 1, disabled = 0).
- 5                               0).
- 6                   LREG - Location area ID registration status field (enabled = 1, disabled = 0).
- 7                               0).
- 8                   P - Parity field.

9   NOTE: The recommended overload control bit assignments are:

- 10           Uniform distribution assigned to normal subscribers = OLC 0 through OLC 9
- 11           Test mobiles = OLC 10
- 12           Emergency mobiles = OLC 11
- 13           Reserved = OLC 12 through OLC 15
- 14           For more information, refer to TSB16.

15   3.7.1.2.3 Registration ID Message

16   The Registration ID Message consists of one word. When sent, the message must be  
17   appended to a System Parameter Overhead Message in addition to any global action  
18   messages.

Information Element	Length (bits)
$T_1 T_2 = 11$	2
DCC	2
REGID	20
END	1
OHD = 000	3
P	12

20

21   The interpretation of the data fields is as follows:

- 22            $T_1 T_2$  - Type field. Set to '11' indicating overhead word.
- 23           DCC - Digital color code field.
- 24           OHD - Overhead message type field. Set to '000' indicating the Registration ID  
25           Message.
- 26           REGID - Registration ID field.

- 1       **END**   - End indication field. Set to '1' to indicate last word of the overhead  
 2               message train; set to '0' if not last word.
- 3       **P**    - Parity field.

4                               **Table 3.7.1.2.3-1. Global Action Message Types**

Action Code	Type
0000	Reserved
0001	Rescan paging channels
0010	Registration increment
0011	Location Area
0100	CDMA capability
0101	Reserved
0110	New access channel set
0111	Random Challenge A
1000	Overload control
1001	Access type parameters
1010	Access attempt parameters
1011	Random Challenge B
1100	Reserved
1101	Reserved
1110	Local control 1
1111	Local Control 2

6

7       **3.7.1.2.4 Control-Filler Message**

8       The Control-Filler Message consists of one word.    is sent whenever there is no other  
 9       message to be sent on the forward control channel. It may be inserted between messages  
 10      as well as between word blocks of a multi-word message. The Control-Filler Message is  
 11      chosen so that when it is sent, the 11-bit word sync sequence (11100010010) will not  
 12      appear in the message stream, independent of the busy-idle bit status.

13      The Control-Filler Message is also used to specify a control mobile attenuation code (CMAC)  
 14      for use by mobile stations accessing the system on the reverse control channel, a wait-for-  
 15      overhead-message bit (WFOM) indicating whether or not mobile stations must read an  
 16      overhead message train before accessing the system, and read the supplementary digital  
 17      color code which mobile stations will return in Word B of the reverse control channel  
 18      message when mobile stations are requested to read control-filler before system access in  
 19      the System Parameter Overhead Message.

Information Element	Length (bits)
$T_1T_2 = 11$	2
DCC	2
010111	6
CMAC	3
SDCC1	2
11	2
SDCC2	2
1	1
WFOM	1
1111	4
OHD = 001	3
P	12

The interpretation of the data fields is as follows:

$T_1T_2$  - Type field. Set to '11' indicating overhead word.

DCC - Digital color code field.

CMAC - Control mobile attenuation field. Indicates the mobile station power level associated with the reverse control channel (see Table 2.1.2-1).

SDCC1, SDCC2- Supplementary Digital Color Codes. If the Supplementary Digital Color Code feature is utilized, the combination of SDCC1 and SDCC2 transmitted by the base station must be a non-zero number. Mobile stations which respond with a non-zero SDCC combination are capable of supporting SDCC. Mobile stations which respond with a zero SDCC combination are not capable of supporting SDCC. The zero SDCC combination is used to indicate either that SDCC1 and SDCC2 are not used or are not supported.

WFOM - Wait-for-overhead-message field.

OHD - Overhead message type field. Set to '001' indicating the control-filler word.

P - Parity field.



## 1 3.7.1.3 Data Restrictions

2 The 11-bit word-sync sequence (11100010010) is shorter than the length of a word, and  
3 therefore can be embedded in a word. Normally, embedded word-sync will not cause a  
4 problem because the next word to be sent will not have the word-sync sequence embedded  
5 in it. There are, however, three cases in which the word-sync sequence may appear  
6 periodically in the FOCC stream. They are:

- 7 • The System Parameter Overhead Message,
- 8 • The Control-Filler Message,
- 9 • Mobile station control messages with pages to mobile stations with certain central  
10 office codes.

11 These three cases are handled by 1) restricting the overhead message transmission rate to  
12 about once per second, 2) designing the Control-Filler Message to exclude the word-sync  
13 sequence, taking into account the various busy-idle bits, and 3) restricting the use of  
14 certain central office codes.

15

Table 3.7.1.3-1. Troublesome Central Office Codes

Bit Pattern Thousands					Central Office Code	Digit
T <sub>1</sub> T <sub>2</sub>	DCC	NXX	X	XXX		
00	ZZ	111110(0)0100	10YY	...	007	0,8,9
00	ZZ	111011(1)0001	0010	...	056	2
00	ZZ	111100(0)1001	0ZZZ	...	070	1-7
00	ZZ	000011(1)0001	0010	...	150	2
00	ZZ	000111(1)0001	0010	...	224	2
00	ZZ	000111(0)0010	010Z	...	225	4,5
00	ZZ	001011(1)0001	0010	...	288	2
00	ZZ	001110(0)0100	10YY	...	339	0,8,9
00	ZZ	001111(1)0001	0010	...	352	2
00	ZZ	001111(0)0010	010Z	...	353	4,5
00	ZZ	010011(1)0001	0010	...	416	2
00	ZZ	010111(1)0001	0010	...	470	2
00	ZZ	010111(0)0010	010Z	...	481	4,5
00	ZZ	011111(1)0001	0010	...	508	2
00	ZZ	011111(0)0010	010Z	...	509	4,5
00	ZZ	011011(1)0001	0010	...	544	2
00	ZZ	011100(0)1001	0ZZZ	...	568	1-7
00	ZZ	011110(0)0100	10YY	...	595	0,8,9
00	11	100010(0)1000	....	...	663	0-9
00	11	100010(0)1001	....	...	664	0-9
00	11	100010(0)1010	....	...	665	0-9
00	11	100010(0)1011	....	...	666	0-9
00	ZZ	100011(1)0001	0010	...	672	2
00	ZZ	100111(1)0001	0010	...	736	2
00	ZZ	100111(0)0010	010Z	...	737	4,5
00	ZZ	101011(1)0001	0010	...	790	2
00	ZZ	101110(0)0100	10YY	...	851	0,8,9
00	ZZ	101111(1)0001	0010	...	864	2
00	ZZ	101111(0)0010	010Z	...	865	4,5
00	Z1	110001(0)0101	....	...	890	0-9
00	Z1	110001(0)0100	....	...	899	0-9
00	ZZ	111000(1)0010	....	...	909	0-9
00	ZZ	110011(1)0001	0010	...	928	2
00	ZZ	110111(1)0001	0010	...	992	2
00	ZZ	110111(0)0010	010Z	...	993	4,5
00	ZZ	111111(0)0010	010Z	...	---	4,5*
00	ZZ	111111(1)0001	0010	...	---	2*

Notes: 1) YY-bits can be '0', but both cannot be '1' at the same time.

- 1           2) Z represents a bit that may be '1' or '0'.
- 2           3) The bit in parentheses is the busy-idle bit.
- 3           4) \* - Central Office Code above 999.
- 4           5) Central Office Codes beginning with '1' and '0' have been included for completeness.

5   If the Mobile Station Control Message (see 3.7.1.1) is examined with the MIN1 separated  
6   into NXX-X-XXX as described in 2.3.1 (where NXX is the central office code, N represents a  
7   number from 2-9, and X represents a number from 0-9), Table 3.7.1.3-1 identifies the  
8   central office codes that are troublesome when used in the 1-word page mode. Use of the  
9   2-word page mode alleviates the possibility of improper word-sync when using troublesome  
10   central office codes. For completeness, all 3-digit combinations that may be troublesome  
11   are shown even though they may be unrealistic, e.g., beginning with 0 or 1.

### 12   3.7.2 Forward Analog Voice Channel

13   The forward voice channel (FVC) is a wideband data stream sent by the base station to the  
14   mobile station. This data stream must be generated at a 10 kbps  $\pm 0.1$  bps rate.  
15   Figure 3.7.2-1 depicts the format of the FVC data stream.

16   A 37-bit dotting sequence (1010....101) and an 11-bit word sync sequence (11100010010)  
17   are sent to permit mobile stations to achieve synchronization with the incoming data,  
18   except at the first repeat of the word, where the 101-bit dotting sequence is used. Each  
19   word contains 40 bits, including parity, and is repeated eleven times together with the 37-  
20   bit dotting and 11-bit word sync sequences; it is then referred to as a word block. A word is  
21   formed by encoding the 28 content bits into a (40, 28) BCH code that has a distance of 5.  
22   (40, 28; 5). The left-most bit (i.e., earliest in time) shall be designated the most-significant  
23   bit. The 28 most-significant bits of the 40-bit field shall be the content bits. The generator  
24   polynomial is the same as that used for the forward control channel (see 3.7.1).

25

Information Element	Length (bits)
DOTTING = 1010...101	101
W.S. = 11100010010	11
Repeat 1 of WORD1	40
DOTTING = 1010...101	37
W.S. = 11100010010	11
Repeat 2 of WORD1	40
...	
DOTTING = 1010...101	37
W.S. = 11100010010	11
Repeat 10 of WORD1	40
DOTTING = 1010...101	37
W.S. = 11100010010	11
Repeat 11 of WORD1	40

Information Element	Length (bits)
DOTTING = 1010...101	101
W.S. = 11100010010	11
Repeat 1 of WORD2	40
DOTTING = 1010...101	37
W.S. = 11100010010	11
Repeat 2 of WORD2	40
...	
DOTTING = 1010...101	37
W.S. = 11100010010	11
Repeat 10 of WORD2	40
DOTTING = 1010...101	37
W.S. = 11100010010	11
Repeat 11 of WORD2	40

Figure 3.7.2-1. Forward Analog Voice Channel Message Stream (Base-to-Mobile)

1 3.7.2.1 Mobile Station Control Message

2 The Mobile Station Control Message is the only message transmitted over the forward voice  
3 channel. The Mobile Station Control Message consists of one or more words.

4 Mobile Station Control Message Word 1

Information Element		Length (bits)	
$T_1 T_2 = 10$		2	
SCC		2	
SCC = 11		SCC $\neq$ 11	
Information Element	Length (bits)	Information Element	Length (bits)
PSCC	2	PSCC	2
EF=0	1	EF=0	1
RSVD = 00000000	8	RSVD = 00000000	7
LOCAL/MSG_TYPE	5	VMAC	3
ORDQ	3	CHAN	11
ORDER	5	P	12
P	12		

5

6 Word 2 - Base Station Challenge Order Confirmation

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 0000	4
AUTHBS	18
RSVD = 0000	4
P	12

7

8

## 1 Word 2 - Unique Challenge Order Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
RANDU	24
P	12

2

## 3 Word 2 - First SSD Update Order Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RANDSSD_1	24
RSVD = 00	2
P	12

4

## 5 Word 2 - First Alert With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RL_W	5
SIGNAL	8
CPN_RL	6
PI	2
SI	2
RSVD=000	3
P	12

6

## 1 Word 2 - First Flash With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
$RL\_W$	5
$CPN\_RL$	6
$PI$	2
$SI$	2
$RSVD = 000 \dots 000$	11
$P$	12

2

## 3 Word 2 - First Alert With Info SMS Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
$R\_W$	7
$SEQ\_NO$	3
$B/F$	2
$TASK\_TM$	1
$RSVD = 00000$	5
$INFO\_DATA$	8
$P$	12

4

## 5 Word 3 - Second SSD Update Order Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
$RANDSSD\_2$	24
$RSVD = 00$	2
$P$	12

6

## 1 Word 3 - Second Alert With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

2

## 3 Word 3 - Second Flash With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

## 5 Word 3 - Second Alert With Info SMS Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
INFO_DATA	24
P	12

6

## 7 Word 4 - Third SSD Update Order Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RANDSSD_3	8
RSVD = 000 ... 000	18
P	12



## 1 Word 4 - Third Alert With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

2

## 3 Word 4 - Third Flash With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

4

## 5 Word 5 - Fourth Alert With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

6

## 1 Word 5 - Fourth Flash With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

2

## 3 Word N - (N-1)th Alert With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

4

## 5 Word N - (N-1)th Flash With Info Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
CHARACTER	8
CHARACTER	8
CHARACTER	8
P	12

6

1 Word N - (N-1)th Alert With Info SMS Word

Information Element	Length (bits)
$T_1 T_2 = 01$	2
RSVD = 00	2
INFO_DATA	24
P	12

2

3 The interpretation of the data fields is as follows:

4  $T_1 T_2$  - Type field. Set to '10' in Word 1. Set to '01' in Word 2 and all subsequent  
 5 Words. Additional words are sent after Word 1 only when one of the  
 6 following orders or confirmations is sent:

- 7 • Base Station Challenge Order Confirmation
- 8 • Unique Challenge Order
- 9 • SSD Update Order
- 10 • Alert With Info
- 11 • Flash With Info
- 12 • Alert With Info SMS

13 SCC - SAT color code for new channel (see Table 3.7.1.1-2).

14 PSCC - Present SAT color code. Indicates the SAT color code associated with the  
 15 present channel.

16 EF - Extended Protocol Forward Channel Indicator (see 5.2).

17 MSG\_TYPE - Message type field. Qualifies the order to a specific action (see  
 18 Table 3.7.1.1-1).

19 ORDER - Order field. Identifies the order type (see Table 3.7.1.1-1).

20 ORDQ - Order Qualifier field. Qualifies the order to a specific action (see  
 21 Table 3.7.1.1-1).

22 LOCAL - Local Control field. This field is specific to each system. The ORDER field  
 23 must be set to local control (see Table 3.7.1.1-1) for this field to be  
 24 interpreted.

25 VMAC - Voice mobile attenuation code field. Indicates the mobile station power  
 26 level associated with the designated analog voice channel. VMAC is  
 27 made of the three least significant bits of MAC in Table 2.1.2-1.

28 CHAN - Channel number field. Indicates the designated RF channel (see 2.3.3).

29 RSVD - Reserved for future use; all bits must be set as indicated.

- 15

10

36

Recommended cadences and their corresponding codes are as follows:

Description	Code
No Tone: Off	000000
Long: 2.0 s on, 4.0 s off, repeating	000001
Short-Short: 0.8 s on, 0.4 s off, 0.8 s on, 4.0 s off, repeating	000010
Short-Short-Long: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 4.0 s off, repeating	000011
Short-Short-2: 1.0 s on, 1.0 s off, 1.0 s on, 3.0 s off, repeating.	000100
Short-Long-Short: 0.5 s on, 0.5 s off, 1.0 s on, 0.5 s off, 0.5 s on, 3.0 s off, repeating.	000101
Short-Short-Short-Short: 0.5 s on, 0.5 s off, 0.5 s on, 0.5 s off, 0.5 s on, 0.5 s off, 0.5 s, 2.5 s off, repeating.	000110
PBX Long: 1.0 s on, 2.0 s off, repeating.	000111
PBX Short-Short: 0.4 s on, 0.2 s off, 0.4 s on, 2.0 off, repeating.	001000
PBX Short-Short-Long: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 1.0 s off, repeating.	001001
PBX Short-Long-Short: 0.4 s on, 0.2 s off, 0.8 s on, 0.2 s off, 0.4 s on, 1.0 s off, repeating.	001010
PBX Short-Short-Short-Short: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.4 s, 0.8 s off, repeating.	001011
Reserved	001100
...	...
Reserved	111111

CPN\_RL - A 6-bit field used to indicate the number of CHARACTERS in the Calling Party Number.

PI - Presentation Indicator. A 2-bit field used to indicate whether or not the calling number should be displayed. See Presentation Indicator, below.

**Presentation Indicator** As defined in ANSI T1.607 §4.5.9, this 2-bit field indicates whether or not the calling number should be displayed.

Description	Code
Presentation allowed	00
Presentation restricted	01
Number not available	10
Reserved	11

**SI** - Screening Indicator. A 2-bit field indicating how the calling number was screened. See Screening Indicator, below.

**Screening Indicator** As defined in ANSI T1.607 §4.5.9, this 2-bit field indicates how the calling number was screened.

Description	Code
User-provided, not screened	00
User-provided, verified and passed	01
User-provided, verified and failed	10
Network-provided	11

**CHARACTER** - An 8-bit representation of an ASCII character, coded as described in Character below and in the references cited therein. Note that in the absence of a sufficient number of characters to completely fill the last Alert With Info or Flash With Info Word, null characters (00000000) are to be used as filler.

**Character** Each character is an 8-bit field coded as follows:

- The most-significant bit is set to '0'.
- The remaining seven bits represent an ASCII character as defined in ANSI X3.4.

**SEQ\_NO** - Sequence number. This field contains the modulo-8 sequence number of the Alert With Info SMS message. This field shall be initialized to '000', and reset to '000' when transmitting a new SMS teleservice message.

1 If an SMS teleservice message spans more than one Alert With Info SMS  
2 message, the sequence number shall be incremented by 1, modulo 8, for  
3 each additional Alert With Info SMS message that is a segment of the  
4 SMS teleservice message.

5 B/F - Begin/Final. This field is used to specify whether the SMS teleservice  
6 message has been segmented into multiple Alert With Info SMS  
7 messages. If the SMS teleservice message is completely contained in a  
8 single Alert With Info SMS message, this field shall be set to '11'. For an  
9 SMS teleservice message contained in multiple Alert With Info SMS  
10 messages, the first segment shall have a value of '10', intermediate  
11 segments shall have a value of '00' and the final segment shall have a  
12 value of '01'. A mobile station must assemble messages for receipt by the  
13 SMS teleservice.

14 TASK\_TM - Task Timer. This field is included in the Alert With Info SMS message to  
15 specify the Waiting for Order Task timeout period. A value of '0' indicates  
16 a 10-second order timer shall be used by the mobile station, and a value  
17 of '1' indicates that a 600 ms order timer shall be used.

18 INFO\_DATA - Info data. This field contains the SMS teleservice message data (see  
19 TIA/EIA/IS-637).

20 P - Parity field.

### 21 3.7.2.2 Calling Number Identification (CNI)

22 Whenever two instances of CNI need to be sent to a mobile station on the Forward Analog  
23 Voice Channel then the base station shall transmit the second instance of CNI using a  
24 "Flash With Info" message. This allows for PI and SI information to be uniquely specified  
25 for each instance of CNI.

#### 1    4 REQUIREMENTS FOR MOBILE STATION ANALOG OPTIONS

2    The extended protocol enhanced services operation as defined in TIA/EIA/IS-91, Section 2,  
3    is incorporated into this standard as an option for the mobile stations that have  
4    implemented these services.

5    Mobile stations may be equipped with the following optional capabilities:

##### 6    4.1 32-Digit Dialing

7    The following optional changes to 2.6.3.7 and 2.7 permit mobile stations to send up to 32  
8    dialed digits to a base station on the reverse control channel in an Origination Message,  
9    and on the reverse voice channel in a Called-Address Message.

##### 10   4.1.1 Service Request - Requirement for 32-Digit Dialing Option

11   The mobile station must continue to send its message to the base station. The information  
12   that must be sent is as follows (with the formats given in 4.1.2):

- 13   • Word A must always be sent.
- 14   • If:
  - 15   -  $E_s = 1$ , or
  - 16   -  $LT_s = 1$ , or
  - 17   -  $AUTH_s = 1$ , or
  - 18   - the ROAM status is enabled, or
  - 19   - the ROAM status is disabled and  $EX_p = 1$ , or
  - 20   - the access is an "order confirmation," or
  - 21   - the access is a "registration," or
  - 22   - the access is a "base station challenge," or
  - 23   - the mobile station was paged with a two-word Mobile Station Control Message,  
24   or
  - 25   -  $RCF = 1$ ,
  - 26   Word B must be sent.



- Word C must be sent as per the following table:

$S_s$ Bit	Type of System Access			
	Registration, Origination or Page Response where $AUTH_s = 0$	Registration, Origination or Page Response where $AUTH_s = 1$	Unique Challenge Order Confirmation	Base Station Challenge
0	Send no Word C	Send Authentication Word C	Send Unique Challenge Order Confirmation Word C	Send Base Station Challenge Word C
1	Send Serial Number Word C	Send Serial Number Word C and Authentication Word C	Send Serial Number Word C and Unique Challenge Order Confirmation Word C	Send Serial Number Word C and Base Station Challenge Word C

- If the access is an "origination,"  
Word D must be sent.
- If the access is an "origination" and 9 to 16 digits were dialed,  
Word E must be sent.
- If the access is an "origination" and 17 to 24 digits were dialed,  
Word F must be sent.
- If the access is an "origination" and 25 to 32 digits were dialed,  
Word G must be sent.

When the mobile station has sent its complete message, it must continue to send unmodulated carrier for a nominal duration of 25 ms and then turn off the transmitter.

The next task to be entered depends on the type of access by the mobile station:

- If the access is an order confirmation, the mobile station must enter the Serving-System Determination Task (see 2.6.3.12).
- If the access is an origination, the mobile station must enter the Await Message Task (see 2.6.3.8).
- If the access is a page response, the mobile station must enter the Await Message Task (see 2.6.3.8).
- If the access is a registration request other than a power down registration the mobile station must enter the Await Registration Confirmation Task (see 2.6.3.9). If the registration is a power down registration the mobile station shall power down.
- If the access is a base station challenge, the mobile station must enter the Await Message Task (see 2.6.3.8).

#### 4.1.2 Signaling Formats - Requirements for 32-Digit Dialing Option

In the message formats used between the mobile stations and base stations, some bits are marked as reserved (RSVD). Some or all of these reserved bits may be used in the future for additional messages. Therefore, all mobile stations and base stations must set all bits that they are programmed to treat as reserved bits to '0' (zero) in all messages that they transmit. All mobile stations and base stations must ignore the state of all bits that they are programmed to treat as reserved bits in all messages that they receive.

##### 4.1.2.1 Reverse Analog Control Channel (RECC) - Requirement for 32-Digit Dialing Option

The reverse analog control channel (RECC) is a wideband data stream sent from the mobile station to the base station. This data stream must be generated at a 10 kbps  $\pm$  1 bps rate. Figure 4.1.2.1-1 depicts the format of the RECC data stream.

Information element	Length (bits)	
DOTTING = 1010...010	30	↑ Seizure Precursor ↓
WORD SYNC = 11100010010	11	
CODED DCC *	7	
1st Word Repeated 5 times	240	
2nd Word Repeated 5 times	240	
3rd Word Repeated 5 times	240	
...		

\* DIGITAL COLOR CODE - Coded per Table 4.1.2.1-1.

**Figure 4.1.2.1-1. Reverse Control Channel Message Stream (Mobile-to-Base)**

All messages begin with the RECC seizure precursor that is composed of a 30-bit dotting sequence (1010...010), an 11-bit word sync sequence (11100010010), and the coded digital color code (DCC). The 7-bit coded DCC is obtained by translating the received DCC according to Table 4.1.2.1-1.

**Table 4.1.2.1-1. Coded Digital Color Code**

Received DCC	7-Bit Coded DCC
00	0000000
01	0011111
10	1100011
11	1111100

Each word contains 48 bits, including parity, and is repeated five times; it is then referred to as a word block. A word is formed by encoding 36 content bits into a (48, 36) BCH code that has a distance of 5, (48, 36; 5). The left-most bit (i.e., earliest in time) shall be designated the most-significant bit. The 36 most-significant bits of the 48-bit field shall be the content bits. The generator polynomial for the code is the same as for the (40, 28; 5) code used on the forward control channel (see 3.7.1).

#### 4.1.2.2 RECC Messages

Each RECC message can consist of one to eight words. The types of messages to be transmitted over the reverse control channel are:

- Page Response Message
- Origination Message
- Order Confirmation Message
- Order Message

These messages are made up of combinations of the following seven words. Note: If included, Words are to be transmitted in the order shown.

Word A - Abbreviated Address Word

Information Element	Length (bits)
F	1
NAWC	3
T	1
S	1
E	1
ER	1
SCM (3-0)	4
MIN1	24
P	12

## 1 Word B - Extended Address Word

Information Element	Length (bits)
F = 0	1
NAWC	3
LOCAL/MSG_TYPE	5
ORDQ	3
ORDER	5
LT	1
EP	1
SCM(4)	1
MPCI	2
SDCC1	2
SDCC2	2
MIN <sub>233-24</sub>	10
P	12

2

## 3 Word C - Serial Number Word

Information Element	Length (bits)
F = 0	1
NAWC	3
ESN	32
P	12

4

## 5 Word C - Authentication Word

Information Element	Length (bits)
F = 0	1
NAWC	3
COUNT	6
RANDC	8
AUTHR	18
P	12

## 1 Word C - Unique Challenge Order Confirmation Word

Information Element	Length (bits)
F = 0	1
NAWC	3
RSVD = 000 ... 000	14
AUTHU	18
P	12

2

## 3 Word C - Base Station Challenge Word

Information Element	Length (bits)
F = 0	1
NAWC	3
RANDBS	32
P	12

4

## 5 Word D - First Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC	3
1st DIGIT	4
2nd DIGIT	4
3rd DIGIT	4
4th DIGIT	4
5th DIGIT	4
6th DIGIT	4
7th DIGIT	4
8th DIGIT	4
P	12

6

7

## 1 Word E - Second Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC = 0	3
9th DIGIT	4
10th DIGIT	4
11th DIGIT	4
12th DIGIT	4
13th DIGIT	4
14th DIGIT	4
15th DIGIT	4
16th DIGIT	4
P	12

2

## 3 Word F - Third Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC = 0	3
17th DIGIT	4
18th DIGIT	4
19th DIGIT	4
20th DIGIT	4
21st DIGIT	4
22nd DIGIT	4
23rd DIGIT	4
24th DIGIT	4
P	12

4

## 1 Word G - Fourth Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC = 0	3
25th DIGIT	4
26th DIGIT	4
27th DIGIT	4
28th DIGIT	4
29th DIGIT	4
30th DIGIT	4
31st DIGIT	4
32nd DIGIT	4
P	12

2

1 4.1.3 Reverse Analog Voice Channel - Requirement for 32-Digit Dialing Option

2 The reverse analog voice channel (RVC) is a wideband data stream sent from the mobile  
 3 station to the base station. This data stream must be generated at a 10 kbps  $\pm$  1 bps rate.  
 4 Figure 4.1.3-1 depicts the format of the RVC data stream.

5

Information Element	Length (bits)
DOTTING	101
W.S.	11
Repeat 1 of WORD1	48
DOTTING	37
W.S.	11
Repeat 2 of WORD 1	48
DOTTING	37
W.S.	11
Repeat 3 of WORD 1	48
DOTTING	37
W.S.	11
Repeat 4 of WORD 1	48
DOTTING	37
W.S.	11
Repeat 5 of WORD 1	48
DOTTING	37
W.S.	11
Repeat 1 of WORD 2	48
...	

6

DOTTING = 1010....101

7

W.S. (WORD SYNC) = 11100010010

8

Figure 4.1.3-1. Reverse Analog Voice Channel Message Stream (Mobile-to-Base)

9



1 A 37-bit dotting sequence (1010...01) and an 11-bit word sync sequence (11100010010) are  
 2 sent to permit base stations to achieve synchronization with the incoming data, except at  
 3 the first repeat of word 1 of the message where a 101-bit dotting sequence is used. Each  
 4 word contains 48 bits, including parity, and is repeated five times together with the 37-bit  
 5 dotting and 11-bit word sync sequences; it is then referred to as a word block. For a multi-  
 6 word message, each additional word block is formed the same as the first word block  
 7 including the 37-bit dotting and 11-bit word sync sequences. A word is formed by encoding  
 8 the 36 content bits into a (48, 36) BCH code that has a distance of 5, (48, 36; 5). The left-  
 9 most bit (i.e., earliest in time) shall be designated the most-significant bit. The 36 most-  
 10 significant bits of the 48-bit field shall be the content bits. The generator polynomial for the  
 11 code is the same as for the (40, 28; 5) code used on the forward control channel (see 3.7.1).

#### 12 4.1.3.1 RVC Messages

13 Each RVC message can consist of one to four words. The types of messages to be  
 14 transmitted over the reverse voice channel are:

- 15 • Order Confirmation Message
- 16 • Called-Address Message
- 17 • Serial Number Response Message
- 18 • Page Response
- 19 • Unique Challenge Order Confirmation
- 20 • Base Station Challenge Order Message

21 The message formats are as follows:

#### 22 Order Confirmation Message

Information Element	Length (bits)
F = 1	1
NAWC = 00	2
T = 1	1
LOCAL/MSG_TYPE	5
ORDQ	3
ORDER	5
RSVD = 000 ... 000	19
P	12

- 1 Called-Address Message:
- 2 Word 1 - First Word of the Called-Address

Information Element	Length (bits)
F = 1	1
NAWC	2
T = 0	1
1st DIGIT	4
2nd DIGIT	4
3rd DIGIT	4
4th DIGIT	4
5th DIGIT	4
6th DIGIT	4
7th DIGIT	4
8th DIGIT	4
P	12

- 3
- 4 Word 2 - Second Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC	2
T = 0	1
9th DIGIT	4
10th DIGIT	4
11th DIGIT	4
12th DIGIT	4
13th DIGIT	4
14th DIGIT	4
15th DIGIT	4
16th DIGIT	4
P	12

1 Word 3 - Third Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC	2
T = 0	1
17th DIGIT	4
18th DIGIT	4
19th DIGIT	4
20th DIGIT	4
21st DIGIT	4
22nd DIGIT	4
23rd DIGIT	4
24th DIGIT	4
P	12

2

3 Word 4 - Fourth Word of the Called-Address

Information Element	Length (bits)
F = 0	1
NAWC = 00	2
T = 0	1
25th DIGIT	4
26th DIGIT	4
27th DIGIT	4
28th DIGIT	4
29th DIGIT	4
30th DIGIT	4
31st DIGIT	4
32nd DIGIT	4
P	12

4

- 1 Serial Number Response Message:
- 2 Word 1 of Serial Number Response Message

Information Element	Length (bits)
F = 1	1
NAWC = 01	2
T = 1	1
LOCAL/MSG_TYPE	5
ORDQ	3
ORDER	5
RSVD = 000 ... 000	19
P	12

- 3
- 4 Word 2 of Serial Number response message

Information Element	Length (bits)
F = 0	1
NAWC = 00	2
T = 1	1
ESN	32
P	12

- 5
- 6 Page Response

Information Element	Length (bits)
F = 1	1
NAWC = 00	2
T = 1	1
MSG_TYPE = 00000	5
ORDQ = 000	3
ORDER = 00000	5
RSVD = 000 ... 000	19
P	12

## 1 Unique Challenge Order Confirmation Message

Information Element	Length (bits)
F = 1	1
NAWC = 00	2
T = 1	1
LOCAL/MSG_TYPE = 0...0	5
ORDQ	3
ORDER	5
AUTHU	18
RSVD = 0	1
P	12

2

## 3 Base Station Challenge Order Message

## 4 Word 1 of Base Station Challenge Order Message

Information Element	Length (bits)
F = 1	1
NAWC = 01	2
T = 1	1
LOCAL/MSG_TYPE = 0...0	5
ORDQ	3
ORDER	5
RSVD = 000 ... 000	19
P	12

5

## 6 Word 2 of Base Station Challenge Order Message

Information Element	Length (bits)
F = 0	1
NAWC = 00	2
T = 1	1
RANDBS	32
P	12

1 The interpretation of the data fields is as follows:

- 2 F - First word field. Set to '1' in first word and '0' in second word.
- 3 NAWC - Number of additional words coming field.
- 4 T - T field. Set to '1' to identify the message as an order or order
- 5 confirmation. Set to '0' to identify the message as a called-address.
- 6 DIGIT - Digit field (see Table 2.7.1-2).
- 7 ORDER - Order field. Identifies the order type (see Table 3.7.1.1-1).
- 8 ORDQ - Order qualifier field. Qualifies the order confirmation to a specific
- 9 action (see Table 3.7.1.1-1).
- 10 LOCAL - Local Control field. This field is specific to each system. The ORDER
- 11 field must be set to local control (see Table 3.7.1.1-1) for this field to
- 12 be interpreted.
- 13 MSG\_TYPE - Message Type field. Qualifies the order (see Table 3.7.1.1-1).
- 14 RSVD - Reserved for future use; all bits must be set as indicated.
- 15 AUTHU - Output of the authentication algorithm when responding to a Unique
- 16 Challenge order (see 2.3.12.1.5).
- 17 RANDBS - Random number used in the SSD update procedure (see 2.3.12.1.8).
- 18 ESN - Electronic Serial Number field. Identifies the electronic serial number
- 19 of the mobile station (see 2.3.2).
- 20 P - Parity field.

#### 21 4.2 Mobile Station Extended Protocol (See also 5.2)

22 The following optional additions to Section 2 provide the structure and signaling procedures  
23 to allow new messages and data to be sent to or transmitted by mobile stations. The term  
24 "mobile stations" is used in the generic sense as indicated in Note 2 and includes  
25 transportable, hand-held and fixed station units as well as mobiles mounted in vehicles.

26 The purpose of this option is to extend the signaling capabilities of the Base station/Mobile  
27 Station interface to allow new features and operational capabilities to be added to existing  
28 and future cellular systems.

29 The Extended Protocol structure and signaling have been designed to allow all four of the  
30 following combinations of systems and mobile stations to be simultaneously operational:

- 31 1. Old systems operating with old mobile stations;
- 32 2. Old systems operating with new mobile stations;
- 33 3. New systems operating with old mobile stations;
- 34 4. New systems operating with new mobile stations;

35 where "old" means a version that does not include this optional capability, and "new"  
36 means a version that does.

#### 4.2.1 RECC Extended Protocol Messages

Each Extended Protocol message starts with a message header. In all cases, the message headers contain among other information:

- Message Length (MSL) indicator;
- Message Type (MST) indicator; and
- Extended Protocol (ER) indicator.

In the RECC, each message header always consists of two words.

##### Header Word A

Information Element	Bit Assignment	Length (bits)
F1	11	2
RSVD	00	2
T	X	1
S	X	1
E	1	1
ER	1	1
SCM	XXXX	4
MIN1	X..X	24
P	X..X	12

##### Header Word B

Information Element	Bit Assignment	Length (bits)
F2	10	2
RSVD	00	2
MSL	X..X	5
MST	X..X	8
LT	X	1
EP	1	1
SCM(4)	X	1
MPCI	XX	2
SDCC1	XX	2
SDCC2	XX	2
MIN2	X..X	10
P	X..X	12

- 1 The interpretation of the data fields is as follows:
- 2 F1 - Start of Header, first word;
  - 3 RSVD - Reserved (new bit assignments);
  - 4 T - Message class, i.e., order or response;
  - 5 S - Send serial number field. If the serial number word is sent, set to '1';
  - 6 if the serial number word is not sent, set to '0'.
  - 7 E - Extended address (Word B to be sent);
  - 8 ER - Extended Protocol (Reverse Channel);
  - 9 SCM - Station Class Mark (unchanged);
  - 10 MIN1 - Subscriber coded directory number (7 digits);
  - 11 P - Cyclic redundancy code;
  - 12 F2 - Second word of header;
  - 13 MSL - Message Length (former LOCAL field);
  - 14 MST - Message Type (former ORDQ and ORDER fields);
  - 15 MIN2 - 3 most significant digits of subscriber directory number;
  - 16 LT - Last Try;
  - 17 EP - Extended Protocol Capability Indicator;
  - 18 MPC1 - Multiple Protocol Capability Indicator;
  - 19 '00' indicates EIA 553 and IS-54-A mobile stations
  - 20 '01' Reserved. (Used to indicate an EIA/TIA IS-54-B-compatible
  - 21 dual-mode mobile station)
  - 22 '10' indicates CDMA-capable dual-mode mobile station
  - 23 '11' reserved
  - 24 SDCC1 - Supplementary Digital Color Code;
  - 25 SDCC2 - Supplementary Digital Color Code;
  - 26 X..X - Variable bit field depending on the message.

27 The following are expanded definitions of the new fields.

- 28 MSL - The Message Length (MSL) field makes use of the former 5-bit LOCAL
- 29 field to allow up to 31 Message Data Words to be appended to a
- 30 message header to form a complete message.
- 31 An all zero MSL field (MSL = 00000) means that there are no Message
- 32 Data Words appended. The header words are not included in the
- 33 message length count.
- 34 MST - The Message Type (MST) field defines the type of message and, by
- 35 implication, the form and format of any appended Message Data
- 36 Words (see Note 11).
- 37 EP - The Extended Protocol (EP) bit is used to indicate to the system that
- 38 the mobile station is capable of using the Extended Protocol.



1           ER - The Extended Protocol Reverse Channel (ER) bit is used to indicate  
 2           that the current message is in the Extended Protocol. If the ER bit is  
 3           a '0' (zero), the message format of 2.7.1.1 above, is being used. If the  
 4           ER bit is a '1' (one), the Extended Protocol message format is being  
 5           used.

6           The generic formats of Message Data Words used are as follows:

7           Message Data Word 1 to N-1

Information Element	Bit Assignment	Length (bits)
F3	01	2
Message Data	X..X	34
P	X..X	12

8

9           Message Data Word N

Information Element	Bit Assignment	Length (bits)
F4	00	2
Message Data	X..X	34
P	X..X	12

10

11          The F1, F2, F3 and F4 fields are used as follows:

12          F1 = 11 = the first header word, Header Word A

13          F2 = 10 = the second header word, Header Word B

14          F3 = 01 = the 1st to N-1 Message Data Word

15          F4 = 00 = the last (Nth) Message Data Word

## 4.2.2 RVC Extended Protocol Messages

In the RVC, each message header consists of one word whose format is shown below.

## RVC Header Word

Information Element	Bit Assignment	Length (bits)
FI	11	2
RSVD	0	1
T	X	1
MSL	X..X	5
MST	X..X	8
ER	1	1
EP	1	1
RSVD	0...0	17
P	X..X	12

The interpretation of the fields is as follows:

- FI - Start of header (Header Word);
- T - Message class, i.e., order or response;
- MSL - Message Length Indicator;
- MST - Message Type Indicator;
- ER - Extended Protocol Reverse Channel indicator;
- EP - Extended Protocol Capability Indicator;
- P - Cyclic redundancy code;
- RSVD - Reserved field.

When ER is set to '0' (zero), the message format and field definitions are as defined in 4.2.1 above. When ER is set to a '1' (one), the message format and field definitions are as shown for the Extended Protocol RVC Header Word.

Message Data Words that are appended to RVC Header Word are formatted in accordance with the generic formats shown in 4.2.1, above.

1

2 No text.

3

## 1    5 REQUIREMENTS FOR BASE STATION ANALOG OPTIONS

2    The extended protocol enhanced services operation as defined in TIA/EIA/IS-91, Section 3,  
3    is incorporated into this standard as an option for the base stations that have implemented  
4    these services.

5    Base stations supporting Short Message Service in the analog mode shall implement  
6    Extended Protocol delivery as described in TIA/EIA/IS-91 or Alert With Info SMS delivery as  
7    defined in 3.7.2.1, or both. Messages less than or equal to 32 digits or 14 characters may  
8    be sent using either delivery method. Messages longer than 32 digits or 14 characters must  
9    be sent using Alert With Info SMS delivery.

10    Base stations may be equipped with the following optional capabilities:

### 11    5.1 32-Digit Dialing

12    No changes to Section 3 are required to permit mobile stations to send up to 32 dialed  
13    digits to a base station on the reverse control channel in an origination message, and on  
14    the reverse voice channel in a Called-Address Message.

15    Note: Base stations that do not have 32-digit dialing capability must not malfunction if a  
16    mobile station sends a Called-Address Message that includes three or four called-address  
17    words.

### 18    5.2 Base Station Extended Protocol

19    See also 4.2.

#### 20    5.2.1 Extended Protocol Mobile Station Control Message

21    The message header consists of only one word when  $T_1 T_2 = '00'$ . If multiple-word messages  
22    are sent then  $T_1 T_2 = '01'$  in word 1 and set to '10' in each additional word. The message  
23    header is defined as follows:

24    Word 1

Information Element	Bit Assignment	Length (bits)
$T_1 T_2$	00 or 01	2
DCC	XX	2
MIN 1	X..X	24
P	X..X	12

25

1 Word 2

Information Element	Bit Assignment	Length (bits)
T <sub>1</sub> T <sub>2</sub>	10	2
SCC	11	2
MIN 2	X..X	10
EF	1	1
MSL	X..X	5
MST	X..X	8
P	X..X	12

2

3 The interpretation of the fields is as follows:

4 T<sub>1</sub>T<sub>2</sub> - Type field. If only Word 1 is sent, set to '00' in Word 1. If a multiple-  
 5 word message is sent, set to '01' in Word 1 and set to '10' in each  
 6 additional word. Note: T<sub>1</sub>T<sub>2</sub> cannot be set to '00' for the last extended  
 7 protocol message, this may look like an abbreviated page.

8 DCC - Digital Color Code;

9 MIN1 - Subscriber coded directory number (7 digits);

10 P - Cyclic redundancy code;

11 SCC - SAT Color Code = 11 = not a channel designation message;

12 MIN2 - 3 most significant digits of subscriber directory number;

13 EF - Extended Protocol (Forward Channel) indicator;

14 MSL - Message Length. Extended Protocol Message Length (former LOCAL);

15 MST - Message Type. Extended Protocol Message Type (former ORDQ and  
 16 ORDER); and

17 X..X - Variable bit field depending on message.

18 The generic format of Message Data Words on the FOCC are as follows:

19 Message Data Word 1 to N

Information Element	Bit Assignment	Length (bits)
T <sub>1</sub> T <sub>2</sub>	10	2
DCC	11	2
Message Data	X..X	24
P	X..X	12

20

1 5.2.2 Extended Protocol Overhead Message

2 One of the formerly reserved (RSVD) bits in Word 1 of the System Parameter Overhead  
 3 Message is used to indicate to mobile stations that the cellular system is equipped to use  
 4 the Extended Protocol (see 3.7.1.2.1.)

5 Word 1

Information Element	Bit Assignment	Length (bits)
T <sub>1</sub> T <sub>2</sub>	11	2
DCC	XX	2
SID 1	X..X	14
EP	1	1
AUTH	X	1
PCI	X	1
NAWC	X..X	4
OHD	110	3
P	X..X	12

6  
 7 All other words of the System Parameter Overhead Message are as defined in 3.7.1.2.1  
 8 through 3.7.1.2.4, above.

9 5.2.3 FVC Extended Protocol Message

10 The FVC message header format is shown below.

11 Word 1 (Control Message)

Information Element	Bit Assignment	Length (bits)
T <sub>1</sub> T <sub>2</sub>	10	2
SCC	11	2
PSCC	XX	2
EF	1	1
RSVD	0...0	8
MSL	X..X	5
MST	X..X	8
P	X..X	12

1 The interpretation of the data fields is as follows:

- 2         $T_1 T_2$  - Type field set to '10' for first word, '01' for additional words;  
 3        SCC - Digital Color Code = 11 = not a channel designation message;  
 4        PSCC - Present SAT Color Code (unchanged);  
 5        EF - Extended Protocol Forward Channel indicator;  
 6        MSL - Message Length indicator. Extended Protocol Message Length;  
 7        MST - Message Type indicator. Extended Protocol Message Type; and  
 8        P - Cyclic redundancy code.

9 The generic format of Message Data Words used in the FVC are as follows:

10 Message Data Word 1 to N

Information Element	Bit Assignment	Length (bits)
$T_1 T_2$	01	2
SCC	11	2
Message Data	X..X	24
P	X..X	12

## 1    **6 REQUIREMENTS FOR MOBILE STATION CDMA OPERATION**

2    This section defines requirements that are specific to CDMA mobile station equipment and  
3    operation. See Section 2 and Section 4 for analog mobile station requirements.

### 4    **6.1 Transmitter**

#### 5    **6.1.1 Frequency Parameters**

##### 6    **6.1.1.1 Channel Spacing and Designation**

7    Channel spacing and designation for the dual-mode mobile station transmissions shall be  
8    as specified in 2.1.1.1. The mobile station shall support CDMA operations on channel  
9    numbers 1013 through 1023, 1 through 311, 356 through 644, 689 through 694, and 739  
10   through 777 inclusive, as shown in Table 6.1.1.1-1.

11   The CDMA frequency assignment in MHz corresponding to the CDMA Channel number  
12   shown in Table 6.1.1.1-1 (expressed as N) is calculated as shown in Table 6.1.1.1-2.

13   Channel numbers for the Primary CDMA Channel and the Secondary CDMA Channel are  
14   given in 7.1.1.1.

##### 15   **6.1.1.2 Frequency Tolerance**

16   When operating in the CDMA transmission mode, the mobile station transmit carrier  
17   frequency shall be 45.0 MHz  $\pm$ 300 Hz lower than the frequency of the base station transmit  
18   signal as measured at the mobile station receiver.

#### 19   **6.1.2 Power Output Characteristics**

20   All power levels are referenced to the mobile station antenna connector unless otherwise  
21   specified.

##### 22   **6.1.2.1 Maximum Output Power**

23   The absolute maximum effective radiated power (ERP) with respect to a half-wave dipole for  
24   any class mobile station transmitter shall be 8 dBW (6.3 Watts). ERP measured during a  
25   transmitted power control group (see 6.1.3.1.7.1) for each mobile station class when  
26   commanded to maximum output power shall be within the limits given in Table 6.1.2.1-1.  
27   These ERP requirements shall be met over the ambient temperature range of -30° C to +60°  
28   C. For a Class III mobile station, the ERP at maximum output power may drop by 2 dB at  
29   60° C.

30



Table 6.1.1.1-1. CDMA Channel Numbers and Corresponding Frequencies

System	Valid CDMA Frequency Assignments	Analog Channel Count	CDMA Channel Number	Transmitter Frequency Assignment (MHz)	
				Mobile	Base
A" (1 MHz)	////////	22	991	824.040	869.040
			1012	824.670	869.670
	CDMA	11	1013	824.700	869.700
			1023	825.000	870.000
A (10 MHz)	CDMA	311	1	825.030	870.030
			311	834.330	879.330
	////////	22	312	834.360	879.360
			333	834.990	879.990
B (10 MHz)	////////	22	334	835.020	880.020
			355	835.650	880.650
	CDMA	289	356	835.680	880.680
			644	844.320	889.320
A' (1.5 MHz)	////////	22	645	844.350	889.350
			666	844.980	889.980
	////////	22	667	845.010	890.010
			688	845.640	890.640
B' (2.5 MHz)	CDMA	6	689	845.670	890.670
			694	845.820	890.820
	////////	22	695	845.850	890.850
			716	846.480	891.480
	////////	22	717	846.510	891.510
			738	847.140	892.140
	CDMA	39	739	847.170	892.170
			777	848.310	893.310
	////////	22	778	848.340	893.340
			799	848.970	893.970

Frequencies in shaded (////////) regions are not valid for CDMA frequency assignments.

**Table 6.1.1.1-2. CDMA Channel Number to CDMA Frequency Assignment Correspondence**

Transmitter	CDMA Channel Number	CDMA Frequency Assignment, MHz
Mobile Station	$1 \leq N \leq 777$	$0.030 N + 825.000$
	$1013 \leq N \leq 1023$	$0.030 (N-1023) + 825.000$
Base Station	$1 \leq N \leq 777$	$0.030 N + 870.000$
	$1013 \leq N \leq 1023$	$0.030 (N-1023) + 870.000$

**Table 6.1.2.1-1. Effective Radiated Power at Maximum Output Power**

Mobile Station Class	ERP at Maximum Output Shall Exceed	ERP at Maximum Output Shall not Exceed
I	1 dBW (1.25 watts)	8 dBW (6.3 watts)
II	-3 dBW (0.5 watts)	4 dBW (2.5 watts)
III	-7 dBW (0.2 watts)	0 dBW (1.0 watts)

#### 6.1.2.2 Output Power Limits

##### 6.1.2.2.1 Minimum Controlled Output Power

With both closed loop and open loop power control functions set to minimum (see 6.1.2.3), the mean output power of the mobile station shall be less than -50 dBm/1.23 MHz (-111 dBm/Hz) for all frequencies within  $\pm 615$  kHz of the center frequency.

##### 6.1.2.2.2 Gated Output Power

When operating in variable data rate transmission mode, the mobile station transmits at nominal controlled power levels only during gated-on periods, each defined as a power control group (see 6.1.3.1.7.1). Given an ensemble of power control groups, all with the same mean output power, the time response of the ensemble average shall be within the limits shown in Figure 6.1.2.2.2-1. During gated-off periods, between the transmissions of power control groups, the mobile station shall reduce its mean output power either by at least 20 dB with respect to the mean output power of the most recent power control group, or to the transmitter noise floor, whichever is the greater power. The transmitter noise floor should be less than -60 dBm/1.23 MHz and shall be less than -54 dBm/1.23 MHz.

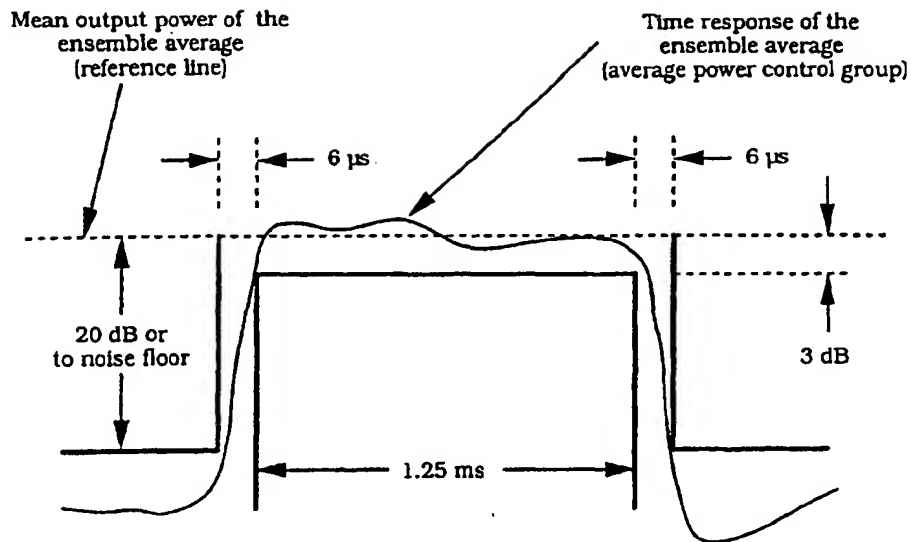


Figure 6.1.2.2.2-1. Transmission Envelope Mask  
(Average Gated-on Power Control Group)

#### 6.1.2.2.3 Standby Output Power

The mobile station shall disable its transmitter except when transmitting an access probe when in the *System Access State* or when in the *Mobile Station Control on the Traffic Channel State* (see 6.6.3 and 6.6.4). When the transmitter is disabled, the output noise density of the mobile station shall be less than -60 dBm/1.23 MHz for all frequencies within the mobile station's transmit band between 824 and 849 MHz.

#### 6.1.2.3 Controlled Output Power

The mobile station shall provide two independent means for output power adjustment: open loop estimation performed by the mobile station and closed loop correction involving both the mobile station and the base station.

Accuracy requirements on the controlled range of mean output power (see 6.1.2.4) need not apply for the following three cases: mean output power levels exceeding the minimum ERP at the maximum output power for the corresponding mobile station class (see Table 6.1.2.1-1); mean output power levels less than the minimum controlled output power (see 6.1.2.2.1); or mean input power levels exceeding -25 dBm within the 1.23 MHz CDMA bandwidth.

##### 6.1.2.3.1 Estimated Open Loop Output Power

In the following equations, mean power is referenced to the nominal CDMA Channel bandwidth of 1.23 MHz.

1 For open loop probing on the Access Channel (with closed loop correction inactive) the  
2 mobile station shall transmit the first probe at a mean output power level defined by<sup>1</sup>

$$\begin{aligned} \text{mean output power (dBm)} = & - \text{mean input power (dBm)} \\ & - 73 \\ & + \text{NOM\_PWR (dB)} \\ & + \text{INIT\_PWR (dB)}. \end{aligned}$$

3 Subsequent probes in an access probe sequence are sent at increased power levels (each  
4 probe is incremented by a value equal to PWR\_STEP) until a response is obtained or the  
5 sequence ends (see 6.6.3.1).

6 The initial transmission on the Reverse Traffic Channel shall be at a mean output power  
7 defined by

$$\begin{aligned} \text{mean output power (dBm)} = & - \text{mean input power (dBm)} \\ & - 73 \\ & + \text{NOM\_PWR (dB)} \\ & + \text{INIT\_PWR (dB)} \\ & + \text{the sum of all access probe corrections (dB)}. \end{aligned}$$

8 Once the first power control bit has been received after initializing Reverse Traffic Channel  
9 transmissions, the mean output power shall be defined by

$$\begin{aligned} \text{mean output power (dBm)} = & - \text{mean input power (dBm)} \\ & - 73 \\ & + \text{NOM\_PWR (dB)} \\ & + \text{INIT\_PWR (dB)} \\ & + \text{the sum of all access probe corrections (dB)} \\ & + \text{the sum of all closed loop power control corrections (dB)}. \end{aligned}$$

10 The values for NOM\_PWR, INIT\_PWR, and the step size of a single access probe correction  
11 PWR\_STEP are system parameters, specified in the *Access Parameters Message* (see  
12 7.7.2.3.2.2) and are obtained by the mobile station prior to transmitting. The range of the  
13 NOM\_PWR parameter is -8 to 7 dB, with a nominal value of 0 dB. The range of the  
14 INIT\_PWR parameter is -16 to 15 dB, with a nominal value of 0 dB. The range of the  
15 PWR\_STEP parameter is 0 to 7 dB. The accuracy of the adjustment to the mean output  
16 power due to NOM\_PWR, INIT\_PWR, or a single access probe correction of PWR\_STEP shall  
17 be  $\pm 0.5$  dB or 20%, whichever is greater.

---

<sup>1</sup>The purpose of having two parameters is to distinguish between their use. If INIT\_PWR were 0, then NOM\_PWR is the correction that should provide the correct received power at the base station. INIT\_PWR is the adjustment that is made to the first Access Channel probe so that it should be received at somewhat less than the required signal power. This conservatism partially compensates for occasional, partially decorrelated path losses between the Forward CDMA Channel and the Reverse CDMA Channel. The constant -73 is equal to  $10 \times \log_{10} (10^{-7.3} \text{ mw}^2)$ . For simplicity, the constant is expressed as -73 with no units.

The mobile station shall support a total combined range of initial offset parameters and closed loop corrections as determined by NOM\_PWR, INIT\_PWR, access probe corrections, and closed loop power control corrections of at least  $\pm 32$  dB.

Prior to application of access probe corrections, closed loop power control corrections, and with INIT\_PWR set to zero, the mobile station's estimated open loop mean output power should be within  $\pm 6$  dB and shall be within  $\pm 9$  dB of the value determined by the following relationship:

$$\begin{aligned} \text{mean output power (dBm)} = & - \text{mean input power (dBm)} \\ & - 73 \\ & + \text{NOM\_PWR (dB)}. \end{aligned}$$

This requirement shall be met over the full range of NOM\_PWR (from -8 to +7 dB).

#### 6.1.2.3.2 Closed Loop Output Power

For closed loop correction on the Reverse Traffic Channel (with respect to the open loop estimate), the mobile station shall adjust its mean output power level in response to each valid power control bit (see 7.1.3.1.7) received on the Forward Traffic Channel. A power control bit shall be considered valid if it is received in a 1.25 ms time slot (see 6.1.3.1.7.1) that is the second time slot following a time slot in which the mobile station transmitted. The change in mean output power level per single power control bit shall be 1 dB nominal. The total changed closed loop mean output power shall be the accumulation of the level changes. The mobile station shall lock the accumulation of valid level changes and shall ignore received power control bits related to gated-off periods when the transmitter is disabled.

The change in mean output power per single power control bit shall be within  $\pm 0.5$  dB of the nominal change, and the change in mean output power level per 10 valid power control bits of the same sign shall be within  $\pm 20\%$  of 10 times the nominal change. A '0' power control bit implies an increase in transmit power; a '1' power control bit implies a decrease in transmit power.

The mobile station shall provide a closed loop adjustment range greater than  $\pm 24$  dB around its open loop estimate.

See 6.6.6.2.7.2 for combining power control bits received from different multipath components or from different base stations during handoff.

#### 6.1.2.4 Power Transition Characteristics

##### 6.1.2.4.1 Open Loop Estimation

Following a step change in mean input power,  $\Delta P_{in}$ , the mean output power of the mobile station shall transition to its final value in a direction opposite in sign to  $\Delta P_{in}$ , with magnitude contained between mask limits defined by:

(a) upper limit:

$$\text{for } 0 < t < 24 \text{ ms: } \max [1.2 \times |\Delta P_{in}| \times (t/24), |\Delta P_{in}| \times (t/24) + 0.5 \text{ dB}],$$

$$\text{for } t \geq 24 \text{ ms: } \max [1.2 \times |\Delta P_{in}|, |\Delta P_{in}| + 0.5 \text{ dB}];$$

(b) lower limit:

$$\text{for } t > 0: \max [0.8 \times |\Delta P_m| \times [1 - e^{(1.25 - t)/36}] - 0.5 \text{ dB}, 0];$$

where  $t$  is expressed in units of milliseconds,  $\Delta P_m$  is expressed in units of dB, and  $\max [x, y]$  is the maximum of  $x$  and  $y$ . These limits shall apply for a step change  $\Delta P_m$  of  $\pm 20$  dB or less. The absolute value of the change in mean output power due to open loop power control shall be a monotonically increasing function of time. If the change in mean output power consists of discrete increments, no single increment shall exceed 0.75 dB. See 6.1.2.3 for the valid range of the mobile station's mean output power.

#### 6.1.2.4.2 Closed Loop Correction

Following the reception of a valid closed loop power control bit, the mean output power of the mobile station shall be within 0.3 dB of the final value in less than 500  $\mu$ s.

### 6.1.3 Modulation Characteristics

#### 6.1.3.1 Reverse CDMA Channel Signals

The Reverse CDMA Channel is composed of Access Channels and Reverse Traffic Channels. These channels shall share the same CDMA frequency assignment using direct-sequence CDMA techniques. Figure 6.1.3.1-1 shows an example of all of the signals received by a base station on the Reverse CDMA Channel. Each Traffic Channel is identified by a distinct user long code sequence; each Access Channel is identified by a distinct Access Channel long code sequence. Multiple Reverse CDMA Channels may be used by a base station in a frequency division multiplexed manner.

The Reverse CDMA Channel has the overall structure shown in Figure 6.1.3.1-2. Data transmitted on the Reverse CDMA Channel is grouped into 20 ms frames. All data transmitted on the Reverse CDMA Channel is convolutionally encoded, block interleaved, modulated by the 64-ary orthogonal modulation, and direct-sequence spread prior to transmission.

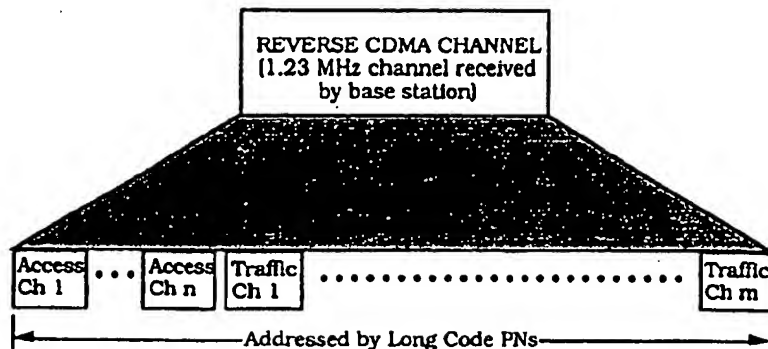


Figure 6.1.3.1-1. Example of Logical Reverse CDMA Channels Received at a Base Station

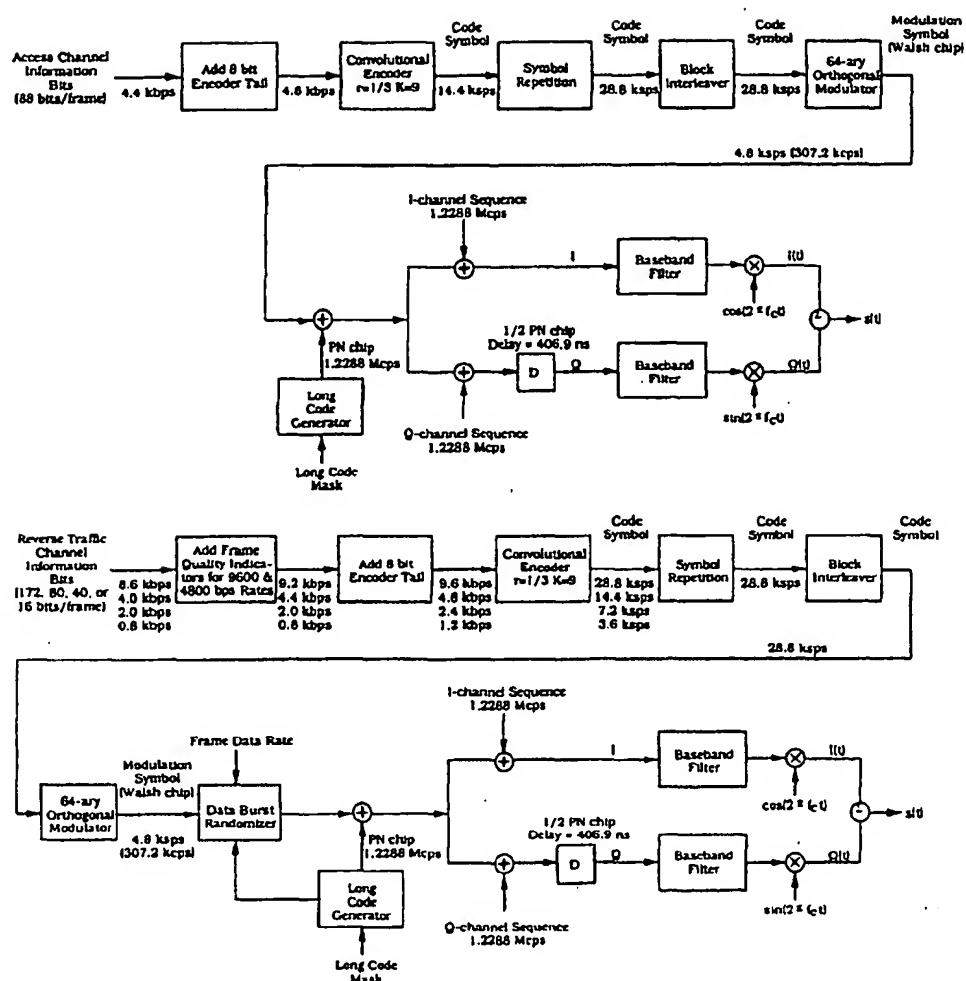


Figure 6.1.3.1-2. Reverse CDMA Channel Structure

After adding frame quality indicators for both the 9600 bps and 4800 bps rates (see 6.1.3.3.2.1) and adding eight Encoder Tail Bits (see 6.1.3.3.2.2), data frames may be transmitted on the Reverse Traffic Channel at data rates of 9600, 4800, 2400, and 1200 bps. The Reverse Traffic Channel may use any of these data rates for transmission. The transmission duty cycle on the Reverse Traffic Channel varies with the transmission data rate. Specifically, the transmission duty cycle for 9600 bps frames is 100 percent, the transmission duty cycle for 4800 bps frames is 50 percent, the transmission duty cycle for 2400 bps frames is 25 percent, and the transmission duty cycle for 1200 bps frames is 12.5 percent as shown in Table 6.1.3.1.1-1. As the duty cycle for transmission varies proportionately with the data rate, the actual burst transmission rate is fixed at 28,800

code symbols per second. Since six code symbols are modulated as one of 64 modulation symbols for transmission, the modulation symbol transmission rate is fixed at 4800 modulation symbols per second. This results in a fixed Walsh chip rate of 307.2 kcps. The rate of the spreading PN sequence is fixed at 1.2288 Mcps, so that each Walsh chip is spread by four PN chips. Table 6.1.3.1.1-1 defines the signal rates and their relationship for the various transmission rates on the Reverse Traffic Channel.

The numerology is identical for the Access Channel except that the transmission rate is fixed at 4800 bps after adding eight Encoder Tail Bits (see 6.1.3.2.2). Each code symbol is repeated once, and the transmission duty cycle is 100 percent. Table 6.1.3.1.1-2 defines the signal rates and their relationship on the Access Channel.

#### 6.1.3.1.1 Modulation Parameters

The modulation parameters for the Reverse Traffic Channel and the Access Channel are shown in Table 6.1.3.1.1-1 and Table 6.1.3.1.1-2, respectively.

**Table 6.1.3.1.1-1. Reverse Traffic Channel Modulation Parameters**

Parameter	Data Rate (bps)				Units
	9600	4800	2400	1200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/3	1/3	1/3	1/3	bits/code sym
Transmit Duty Cycle	100.0	50.0	25.0	12.5	%
Code Symbol Rate	28.800	28.800	28.800	28.800	sps
Modulation	6	6	6	6	code sym/mod symbol
Modulation Symbol Rate	4800	4800	4800	4800	sps
Walsh Chip Rate	307.20	307.20	307.20	307.20	kcps
Mod Symbol Duration	208.33	208.33	208.33	208.33	μs
PN Chips/Code Symbol	42.67	42.67	42.67	42.67	PN chip/code symbol
PN Chips/Mod symbol	256	256	256	256	PN chip/mod symbol
PN Chips/Walsh Chip	4	4	4	4	PN chips/Walsh chip



Table 6.1.3.1.1-2. Access Channel Modulation Parameters

Parameter	Data Rate (bps)	Units
	4800	
PN Chip Rate	1.2288	Mcps
Code Rate	1/3	bits/code sym
Code Symbol Repetition	2	symbols/code sym
Transmit Duty Cycle	100.0	%
Code Symbol Rate	28,800	sps
Modulation	6	code sym/mod symbol
Modulation Symbol Rate	4800	sps
Walsh Chip Rate	307.20	kcps
Mod Symbol Duration	208.33	$\mu$ s
PN Chips/Code Symbol	42.67	PN chip/code sym
PN Chips/Mod symbol	256	PN chip/mod symbol
PN Chips/Walsh Chip	4	PN chips/Walsh chip

#### 6.1.3.1.2 Data Rates

The Access Channel shall support fixed data rate operation at 4800 bps.

The Reverse Traffic Channel shall support variable data rate operation at 9600, 4800, 2400, and 1200 bps.

#### 6.1.3.1.3 Convolutional Encoding

The mobile station shall convolutionally encode the data transmitted on the Reverse Traffic Channel and the Access Channel prior to interleaving. The convolutional code shall be rate 1/3 and has a constraint length of 9. The generator functions for this code shall be  $g_0$  equals 557 (octal),  $g_1$  equals 663 (octal), and  $g_2$  equals 711 (octal). This is a rate 1/3 code generating three code symbols for each data bit input to the encoder. These code symbols shall be output so that the code symbol ( $c_0$ ) encoded with generator function  $g_0$  shall be output first, the code symbol ( $c_1$ ) encoded with generator function  $g_1$  shall be output second, and the code symbol ( $c_2$ ) encoded with generator function  $g_2$  shall be output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol output after initialization shall be a code symbol encoded with generator function  $g_0$ .

Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-delayed data sequence. The length of the data sequence delay is equal to  $K-1$ , where  $K$  is the constraint length of the code. Figure 6.1.3.1.3-1 illustrates the encoder for the code specified in this section.

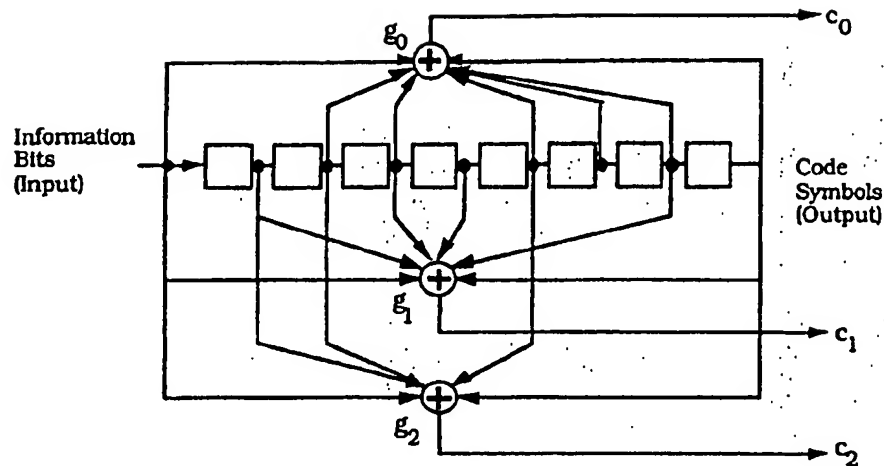


Figure 6.1.3.1.3-1. K = 9, Rate 1/3 Convolutional Encoder

#### 6.1.3.1.4 Code Symbol Repetition

Code symbols output from the convolutional encoder are repeated before being interleaved when the data rate is lower than 9600 bps.

Code symbol repetition on the Reverse Traffic Channel is only used as an expedient method for describing the operation of the block interleaver specified in 6.1.3.1.5 and the data burst randomizer specified in 6.1.3.1.7.2. Implementations other than code symbol repetition that achieve the same result are allowed.

The code symbol repetition rate on the Reverse Traffic Channel varies with data rate. Code symbols shall not be repeated for the 9600 bps data rate. Each code symbol at the 4800 bps data rate shall be repeated 1 time (each symbol occurs 2 consecutive times). Each code symbol at the 2400 bps data rate shall be repeated 3 times (each symbol occurs 4 consecutive times). Each code symbol at the 1200 bps data rate shall be repeated 7 times (each symbol occurs 8 consecutive times). For all of the data rates (9600, 4800, 2400, and 1200 bps), this results in a constant code symbol rate of 28800 code symbols per second. On the Reverse Traffic Channel these repeated code symbols shall not be transmitted multiple times. Rather, the repeated code symbols shall be input to the block interleaver function, and all but one of the code symbol repetitions shall be deleted prior to actual transmission due to the variable transmission duty cycle.

For the Access Channel, which has a fixed data rate of 4800 bps, each code symbol shall be repeated 1 time (each symbol occurs 2 consecutive times). On the Access Channel both repeated code symbols shall be transmitted.

### 6.1.3.1.5 Block Interleaving

The mobile station shall interleave all code symbols on the Reverse Traffic Channel and the Access Channel prior to modulation and transmission. A block interleaver spanning 20 ms shall be used. The interleaver shall be an array with 32 rows and 18 columns (i.e., 576 cells). Code symbols (repeated code symbols when at data rates lower than 9600 bps) shall be written into the interleaver by columns filling the complete  $32 \times 18$  matrix. Tables 6.1.3.1.5-1 through 6.1.3.1.5-4 illustrate the ordering of write operations of code symbols (or repeated code symbols) into the interleaver array for transmission data rates of 9600, 4800, 2400, and 1200 bps, respectively.

Reverse Traffic Channel code symbols shall be output from the interleaver by rows. The interleaver rows shall be output in the following order:

At 9600 bps:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

At 4800 bps:

1 3 2 4 5 7 6 8 9 11 10 12 13 15 14 16 17 19 18 20 21 23 22 24 25 27 26 28 29 31 30 32

At 2400 bps:

1 5 2 6 3 7 4 8 9 13 10 14 11 15 12 16 17 21 18 22 19 23 20 24 25 29 26 30 27 31 28 32

At 1200 bps:

1 9 2 10 3 11 4 12 5 13 6 14 7 15 8 16 17 25 18 26 19 27 20 28 21 29 22 30 23 31 24 32

Access Channel code symbols shall be output from the interleaver by rows. The interleaver rows shall be output in the following order:<sup>2</sup>

1 17 9 25 5 21 13 29 3 19 11 27 7 23 15 31 2 18 10 26 6 22 14 30 4 20 12 28 8 24 16 32

<sup>2</sup>This is a bit-reversed readout of the row addresses. If there is a binary counter  $c_4c_3c_2c_1c_0$ , counting from 0 through 31, and  $n$  is a 5-bit binary number,  $n = a_4a_3a_2a_1a_0$ , where  $a_4=c_0$ ,  $a_3=c_1$ ,  $a_2=c_2$ ,  $a_1=c_3$ ,  $a_0=c_4$ , then the row address is given by  $n+1$ .

**Table 6.1.3.1.5-1. Reverse Traffic Channel Interleaver Memory**  
**(Write Operation) (9600 bps)**

1	33	65	97	129	161	193	225	257	289	321	353	385	417	449	481	513	545
2	34	66	98	130	162	194	226	258	290	322	354	386	418	450	482	514	546
3	35	67	99	131	163	195	227	259	291	323	355	387	419	451	483	515	547
4	36	68	100	132	164	196	228	260	292	324	356	388	420	452	484	516	548
5	37	69	101	133	165	197	229	261	293	325	357	389	421	453	485	517	549
6	38	70	102	134	166	198	230	262	294	326	358	390	422	454	486	518	550
7	39	71	103	135	167	199	231	263	295	327	359	391	423	455	487	519	551
8	40	72	104	136	168	200	232	264	296	328	360	392	424	456	488	520	552
9	41	73	105	137	169	201	233	265	297	329	361	393	425	457	489	521	553
10	42	74	106	138	170	202	234	266	298	330	362	394	426	458	490	522	554
11	43	75	107	139	171	203	235	267	299	331	363	395	427	459	491	523	555
12	44	76	108	140	172	204	236	268	300	332	364	396	428	460	492	524	556
13	45	77	109	141	173	205	237	269	301	333	365	397	429	461	493	525	557
14	46	78	110	142	174	206	238	270	302	334	366	398	430	462	494	526	558
15	47	79	111	143	175	207	239	271	303	335	367	399	431	463	495	527	559
16	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496	528	560
17	49	81	113	145	177	209	241	273	305	337	369	401	433	465	497	529	561
18	50	82	114	146	178	210	242	274	306	338	370	402	434	466	498	530	562
19	51	83	115	147	179	211	243	275	307	339	371	403	435	467	499	531	563
20	52	84	116	148	180	212	244	276	308	340	372	404	436	468	500	532	564
21	53	85	117	149	181	213	245	277	309	341	373	405	437	469	501	533	565
22	54	86	118	150	182	214	246	278	310	342	374	406	438	470	502	534	566
23	55	87	119	151	183	215	247	279	311	343	375	407	439	471	503	535	567
24	56	88	120	152	184	216	248	280	312	344	376	408	440	472	504	536	568
25	57	89	121	153	185	217	249	281	313	345	377	409	441	473	505	537	569
26	58	90	122	154	186	218	250	282	314	346	378	410	442	474	506	538	570
27	59	91	123	155	187	219	251	283	315	347	379	411	443	475	507	539	571
28	60	92	124	156	188	220	252	284	316	348	380	412	444	476	508	540	572
29	61	93	125	157	189	221	253	285	317	349	381	413	445	477	509	541	573
30	62	94	126	158	190	222	254	286	318	350	382	414	446	478	510	542	574
31	63	95	127	159	191	223	255	287	319	351	383	415	447	479	511	543	575
32	64	96	128	160	192	224	256	288	320	352	384	416	448	480	512	544	576

1 **Table 6.1.3.1.5-2. Reverse Traffic Channel or Access Channel Interleaver Memory**  
 2 **(Write Operation) (4800 bps)**

1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241	257	273
1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241	257	273
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242	258	274
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242	258	274
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243	259	275
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243	259	275
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244	260	276
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244	260	276
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245	261	277
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245	261	277
6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246	262	278
6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246	262	278
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247	263	279
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247	263	279
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248	264	280
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248	264	280
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249	265	281
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249	265	281
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250	266	282
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250	266	282
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251	267	283
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251	267	283
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252	268	284
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252	268	284
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253	269	285
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253	269	285
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254	270	286
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254	270	286
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255	271	287
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255	271	287
16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288
16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288

**Table 6.1.3.1.5-3. Reverse Traffic Channel Interleaver Memory  
(Write Operation) (2400 bps)**

1	9	17	25	33	41	49	57	65	73	81	89	97	105	113	121	129	137
1	9	17	25	33	41	49	57	65	73	81	89	97	105	113	121	129	137
1	9	17	25	33	41	49	57	65	73	81	89	97	105	113	121	129	137
1	9	17	25	33	41	49	57	65	73	81	89	97	105	113	121	129	137
2	10	18	26	34	42	50	58	66	74	82	90	98	106	114	122	130	138
2	10	18	26	34	42	50	58	66	74	82	90	98	106	114	122	130	138
2	10	18	26	34	42	50	58	66	74	82	90	98	106	114	122	130	138
2	10	18	26	34	42	50	58	66	74	82	90	98	106	114	122	130	138
3	11	19	27	35	43	51	59	67	75	83	91	99	107	115	123	131	139
3	11	19	27	35	43	51	59	67	75	83	91	99	107	115	123	131	139
3	11	19	27	35	43	51	59	67	75	83	91	99	107	115	123	131	139
3	11	19	27	35	43	51	59	67	75	83	91	99	107	115	123	131	139
4	12	20	28	36	44	52	60	68	76	84	92	100	108	116	124	132	140
4	12	20	28	36	44	52	60	68	76	84	92	100	108	116	124	132	140
4	12	20	28	36	44	52	60	68	76	84	92	100	108	116	124	132	140
4	12	20	28	36	44	52	60	68	76	84	92	100	108	116	124	132	140
5	13	21	29	37	45	53	61	69	77	85	93	101	109	117	125	133	141
5	13	21	29	37	45	53	61	69	77	85	93	101	109	117	125	133	141
5	13	21	29	37	45	53	61	69	77	85	93	101	109	117	125	133	141
5	13	21	29	37	45	53	61	69	77	85	93	101	109	117	125	133	141
6	14	22	30	38	46	54	62	70	78	86	94	102	110	118	126	134	142
6	14	22	30	38	46	54	62	70	78	86	94	102	110	118	126	134	142
6	14	22	30	38	46	54	62	70	78	86	94	102	110	118	126	134	142
6	14	22	30	38	46	54	62	70	78	86	94	102	110	118	126	134	142
7	15	23	31	39	47	55	63	71	79	87	95	103	111	119	127	135	143
7	15	23	31	39	47	55	63	71	79	87	95	103	111	119	127	135	143
7	15	23	31	39	47	55	63	71	79	87	95	103	111	119	127	135	143
7	15	23	31	39	47	55	63	71	79	87	95	103	111	119	127	135	143
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144

**Table 6.1.3.1.5-4. Reverse Traffic Channel Interleaver Memory  
(Write Operation) (1200 bps)**

1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69
1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69
1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69
1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69
1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69
1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69
1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69
2	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
2	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
2	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
2	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
2	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
2	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
2	6	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70
3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71
3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71
3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71
3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71
3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71
3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71
3	7	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72

1 6.1.3.1.6 Orthogonal Modulation

2 Modulation for the Reverse CDMA Channel shall be 64-ary orthogonal modulation. One of  
 3 64 possible modulation symbols is transmitted for each six code symbols. The modulation  
 4 symbol shall be one of 64 mutually orthogonal waveforms generated using Walsh functions.  
 5 These modulation symbols are given in Table 6.1.3.1.6-1 and are numbered 0 through 63.  
 6 The modulation symbols shall be selected according to the following formula:

7 
$$\text{Modulation symbol index} = c_0 + 2c_1 + 4c_2 + 8c_3 + 16c_4 + 32c_5,$$

8 where  $c_5$  shall represent the last (or most recent) and  $c_0$  the first (or oldest) binary valued  
 9 ('0' and '1') code symbol of each group of six code symbols that form a modulation symbol  
 10 index.

11 The 64 by 64 matrix shown in Table 6.1.3.1.6-1 can be generated by means of the following  
 12 recursive procedure:

13 
$$H_1 = 0, \quad H_2 = \begin{matrix} 0 & 0 \\ 0 & 1 \end{matrix}.$$

14

15 
$$H_4 = \begin{matrix} 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{matrix}, \quad H_{2N} = \begin{matrix} H_N & H_N \\ H_N & \overline{H_N} \end{matrix}.$$

16 where  $N$  is a power of 2 and  $\overline{H_N}$  denotes the binary complement of  $H_N$ .

17 The period of time required to transmit a single modulation symbol shall be equal to  
 18  $1/4800$  second ( $= 208.333... \mu\text{s}$ ). The period of time associated with one-sixty-fourth of the  
 19 modulation symbol is referred to as a Walsh chip and shall be equal to  $1/307200$  second ( $=$   
 20  $3.255... \mu\text{s}$ ).

21 Within a modulation symbol, Walsh chips shall be transmitted in the order of 0, 1, 2, ...,  
 22 63.



1

Modulation Symbol Index

### 6.1.3.1.7 Variable Data Rate Transmission

#### 6.1.3.1.7.1 Rates and Gating

Prior to transmission, the Reverse Traffic Channel interleaver output stream is time gated to allow transmission of certain interleaver output symbols and deletion of others. This process is illustrated in Figure 6.1.3.1.7.1-1. As shown in the figure, the duty cycle of the transmission gate varies with the transmit data rate. When the transmit data rate is 9600 bps, the transmission gate allows all interleaver output symbols to be transmitted. When the transmit data rate is 4800 bps, the transmission gate allows one-half of the interleaver output symbols to be transmitted, and so forth. The gating process operates by dividing the 20 ms frame into 16 equal length (i.e., 1.25 ms) periods, called power control groups. Certain power control groups are gated-on (i.e., transmitted), while other groups are gated-off (i.e., not transmitted).

The assignment of gated-on and gated-off groups, referred to as the data burst randomizing function, is specified in 6.1.3.1.7.2. The gated-on power control groups are pseudorandomized in their positions within the frame. The data burst randomizer ensures that every code symbol input to the repetition process is transmitted exactly once. During the gated-off periods, the mobile station shall comply with the requirement in 6.1.2.2.2, thus reducing the interference to other mobile stations operating on the same Reverse CDMA Channel.

When transmitting on the Access Channel, the code symbols are repeated once (each symbol occurs twice) prior to transmission. The data burst randomizer is not used when the mobile station transmits on the Access Channel. Therefore, both copies of the repeated code symbols are transmitted as shown in Figure 6.1.3.1.7.1-2.

#### 6.1.3.1.7.2 Data Burst Randomizing Algorithm

The data burst randomizer generates a masking pattern of '0's and '1's that randomly masks out the redundant data generated by the code repetition. The masking pattern is determined by the data rate of the frame and by a block of 14 bits taken from the long code. These 14 bits shall be the last 14 bits of the long code used for spreading in the previous to the last power control group of the previous frame (see Figure 6.1.3.1.7.1-1). In other words, these are the 14 bits which occur exactly one power control group (1.25 ms) before each Reverse Traffic Channel frame boundary. These 14 bits are denoted as

$$b_0 \ b_1 \ b_2 \ b_3 \ b_4 \ b_5 \ b_6 \ b_7 \ b_8 \ b_9 \ b_{10} \ b_{11} \ b_{12} \ b_{13}$$

where  $b_0$  represents the oldest bit, and  $b_{13}$  represents the latest bit.<sup>3</sup>

<sup>3</sup>In order to randomize the position of the data bursts, only 8 bits are strictly necessary. The algorithm described here uses 14 bits to assure that the slots used for data transmission at the quarter rate are a subset of the slots used at the half rate and that the slots used at the one-eighth rate are a subset of the slots used at the quarter rate.

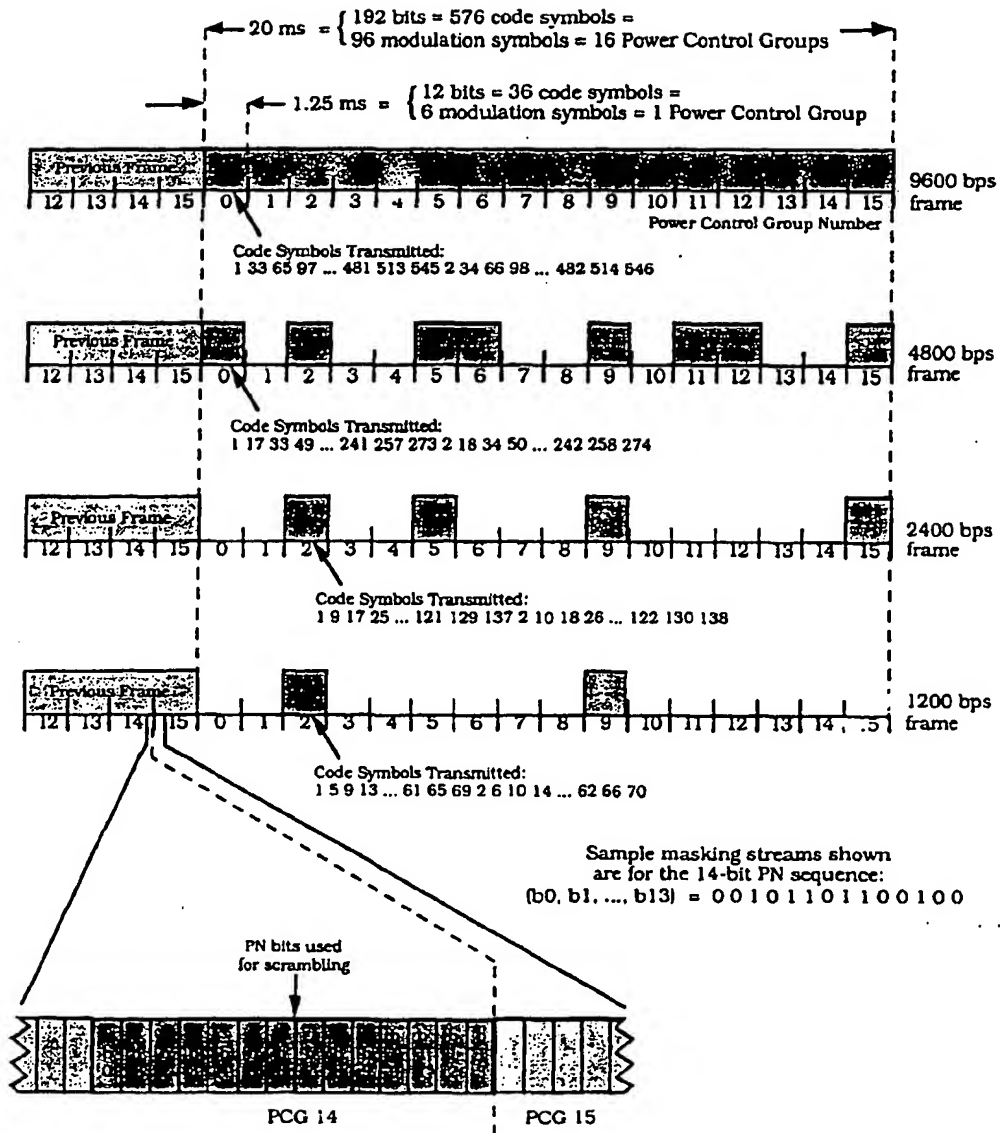


Figure 6.1.3.1.7.1-1. Reverse CDMA Channel Variable Data Rate Transmission Example

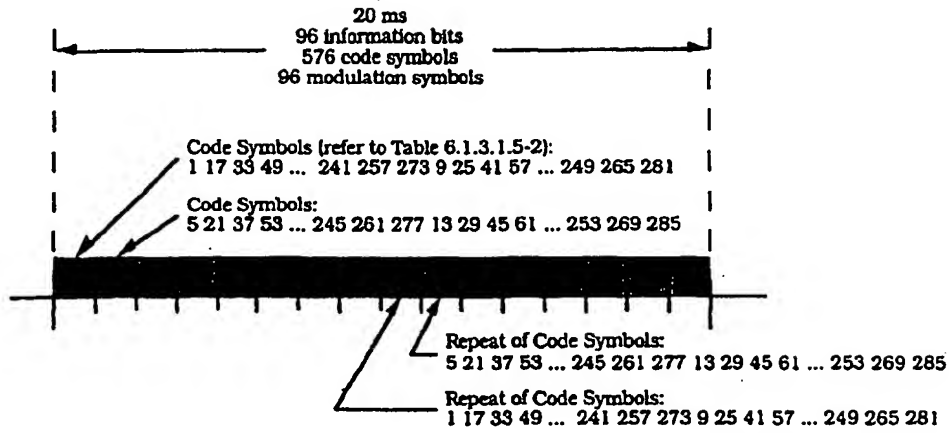


Figure 6.1.3.1.7.1-2. Access Channel Transmission Structure

Each 20 ms Reverse Traffic Channel frame shall be divided into 16 equal length (i.e., 1.25 ms) power control groups numbered from 0 to 15 as shown in Figure 6.1.3.1.7.1-1. The data burst randomizer algorithm shall be as follows:

Data Rate Selected: 9600 bps

Transmission shall occur on power control groups numbered:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.

Data Rate Selected: 4800 bps

Transmission shall occur on power control groups numbered:

$b_0, 2 + b_1, 4 + b_2, 6 + b_3, 8 + b_4, 10 + b_5, 12 + b_6, 14 + b_7.$

Data Rate Selected: 2400 bps

Transmission shall occur on power control groups numbered:

$b_0$  if  $b_8 = 0$ ,  $\alpha$   $2 + b_1$  if  $b_8 = 1$ ;  
 $4 + b_2$  if  $b_9 = 0$ ,  $\alpha$   $6 + b_3$  if  $b_9 = 1$ ;  
 $8 + b_4$  if  $b_{10} = 0$ ,  $\alpha$   $10 + b_5$  if  $b_{10} = 1$ ;  
 $12 + b_6$  if  $b_{11} = 0$ ,  $\alpha$   $14 + b_7$  if  $b_{11} = 1$ .

1 Data Rate Selected: 1200 bps

2 Transmission shall occur on power control groups numbered:

3  $b_0$  if  $(b_8 = 0 \text{ and } b_{12} = 0)$ ,  $\alpha$   $2 + b_1$  if  $(b_8 = 1 \text{ and } b_{12} = 0)$ ,  
 4  $\alpha$   $4 + b_2$  if  $(b_9 = 0 \text{ and } b_{12} = 1)$ ,  $\alpha$   $6 + b_3$  if  $(b_9 = 1 \text{ and } b_{12} = 1)$ ;  
 5  $8 + b_4$  if  $(b_{10} = 0 \text{ and } b_{13} = 0)$ ,  $\alpha$   $10 + b_5$  if  $(b_{10} = 1 \text{ and } b_{13} = 0)$ ,  
 6  $\alpha$   $12 + b_6$  if  $(b_{11} = 0 \text{ and } b_{13} = 1)$ , or  $14 + b_7$  if  $(b_{11} = 1 \text{ and } b_{13} = 1)$ .

#### 7 6.1.3.1.8 Direct Sequence Spreading

8 Direct sequence spreading using the long code shall be applied to the Reverse Traffic  
 9 Channel and the Access Channel. For the Reverse Traffic Channel, this spreading  
 10 operation involves modulo-2 addition of the data burst randomizer output stream and the  
 11 long code. For the Access Channel, this spreading operation involves modulo-2 addition of  
 12 the 64-ary orthogonal modulator output stream and the long code.

13 This long code shall be periodic with period  $2^{42}-1$  chips and shall satisfy the linear  
 14 recursion specified by the following characteristic polynomial:

$$15 \quad p(x) = x^{42} + x^{35} + x^{33} + x^{31} + x^{27} + x^{26} + x^{25} + x^{22} + x^{21} + x^{19} + \\ 16 \quad x^{18} + x^{17} + x^{16} + x^{10} + x^7 + x^6 + x^5 + x^3 + x^2 + x^1 + 1.$$

17 Each PN chip of the long code shall be generated by the modulo-2 inner product of a 42-bit  
 18 mask and the 42-bit state vector of the sequence generator as shown in Figure 6.1.3.1.8-1.

19 The time alignment of the long code generator shall be as shown in Figure 1.2-1.

20 The mask used for the long code varies depending on the channel type on which the mobile  
 21 station is transmitting. See Figure 6.1.3.1.8-2. Specifically, when transmitting on the  
 22 Access Channel, the mask shall be as follows:  $M_{41}$  through  $M_{33}$  shall be set to  
 23 '110001111';  $M_{32}$  through  $M_{28}$  shall be set to the Access Channel number chosen (see  
 24 6.6.3.1.1.2);  $M_{27}$  through  $M_{25}$  shall be set to the code channel number for the associated  
 25 Paging Channel (the range is 1 through 7),  $M_{24}$  through  $M_9$  shall be set to the BASE\_ID  
 26 value (see 7.7.2.3.2.1) for the current base station; and  $M_8$  through  $M_0$  shall be set to the  
 27 PILOT\_PN value for the current CDMA Channel (see 7.7.1.3).

28 When transmitting on the Reverse Traffic Channel, the mobile station shall use one of two  
 29 long code masks unique to that mobile station: a public long code mask unique to the  
 30 mobile station's ESN or a private long code mask. The public long code mask shall be as  
 31 follows:  $M_{41}$  through  $M_{32}$  shall be set to '1100011000', and  $M_{31}$  through  $M_0$  shall be set  
 32 to a permutation of the mobile station's ESN bits. This permutation is specified as follows:

$$33 \quad \text{ESN} = (E_{31}, E_{30}, E_{29}, E_{28}, E_{27}, E_{26}, E_{25}, \dots, E_2, E_1, E_0) \\ 34 \quad \text{Permuted ESN} = (E_0, E_{31}, E_{22}, E_{13}, E_4, E_{26}, E_{17}, E_8, E_{30}, E_{21}, E_{12}, E_3, E_{25}, E_{16}, \\ 35 \quad E_7, E_{29}, E_{20}, E_{11}, E_2, E_{24}, E_{15}, E_6, E_{28}, E_{19}, E_{10}, E_1, E_{23}, E_{14}, \\ 36 \quad E_5, E_{27}, E_{18}, E_9).^4$$

37 The private long code mask shall be as specified in Appendix A.

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<sup>4</sup>This permutation prevents high correlation between long codes corresponding to consecutive ESNs.

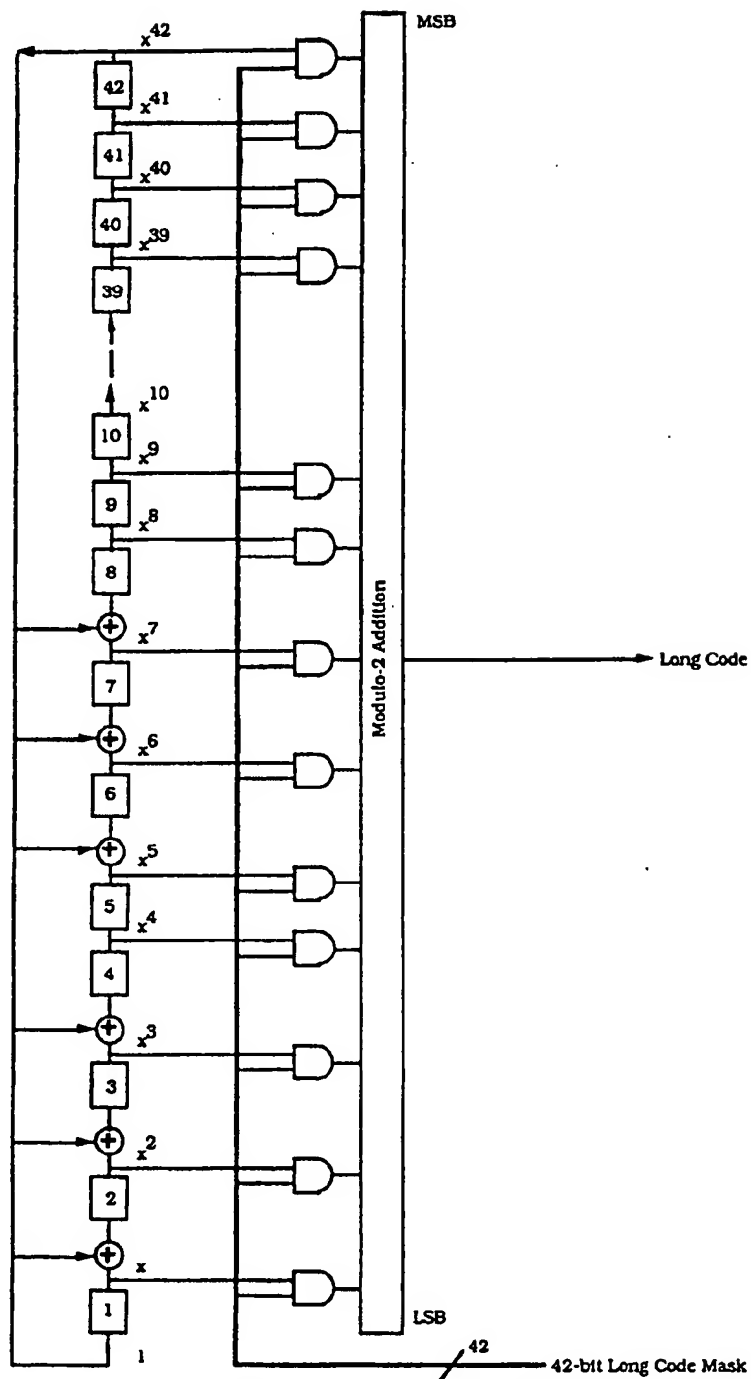
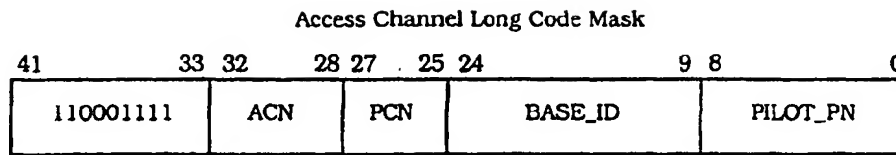


Figure 6.1.3.1.8-1. Long Code Generator



ACN - Access Channel Number  
 PCN - Paging Channel Number  
 BASE\_ID - Base station identification  
 PILOT\_PN - PN offset for the Forward CDMA Channel

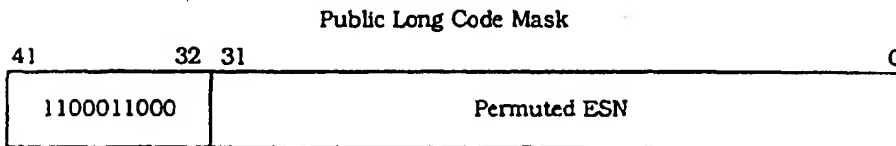


Figure 6.1.3.1.8-2. Long Code Mask Format

#### 6.1.3.1.9 Quadrature Spreading

Following the direct sequence spreading, the Reverse Traffic Channel and Access Channel are spread in quadrature as shown in Figure 6.1.3.1-2. The sequences used for this spreading shall be the zero-offset I and Q pilot PN sequences used on the Forward CDMA Channel (see 7.1.3.2.1). These sequences are periodic with period  $2^{15}$  chips and shall be based on the following characteristic polynomials, respectively:

$$P_I(x) = x^{15} + x^{13} + x^9 + x^8 + x^7 + x^5 + 1$$

(for the in-phase (I) sequence)

and

$$P_Q(x) = x^{15} + x^{12} + x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

(for the quadrature-phase (Q) sequence).

The maximum length linear feedback shift register sequences,  $\{i(n)\}$  and  $\{q(n)\}$ , based on the above polynomials are of period  $2^{15}-1$  and can be generated by using the following linear recursions:

$$i(n) = i(n-15) \oplus i(n-10) \oplus i(n-8) \oplus i(n-7) \oplus i(n-6) \oplus i(n-2)$$

(based on  $P_I(x)$  as the characteristic polynomial)

and

$$q(n) = q(n-15) \oplus q(n-12) \oplus q(n-11) \oplus q(n-10) \oplus q(n-9) \oplus q(n-5) \oplus q(n-4) \oplus q(n-3)$$

(based on  $P_Q(x)$  as the characteristic polynomial).

where  $i(n)$  and  $q(n)$  are binary-valued ('0' and '1') and the additions are modulo-2. In order to obtain the I and Q pilot PN sequences (of period  $2^{15}$ ), a '0' is inserted in  $i(n)$  and  $q(n)$  after 14 consecutive '0' outputs (this occurs only once in each period). Therefore, the pilot PN sequences have one run of 15 consecutive '0' outputs instead of 14.

The mobile station shall align the I and Q pilot PN sequences such that the first chip on every even second mark as referenced to the transmit time reference (see 6.1.5.1) is the '1' after the 15 consecutive '0's (see Figure 1.2-1).

The pilot PN sequences repeat every 26.666... ms ( $= 2^{15}/1228800$  seconds). There are exactly 75 repetitions in every 2 seconds.

The data spread by the Q pilot PN sequence shall be delayed by half a PN chip time (406.901 ns) with respect to the data spread by the I pilot PN sequence.

After baseband filtering (see 6.1.3.1.10), the binary data ('0's and '1's), I and Q shown in Figure 6.1.3.1-2, shall be mapped into phase according to Table 6.1.3.1.9-1.

Table 6.1.3.1.9-1. Reverse CDMA Channel I and Q Mapping

I	Q	Phase
0	0	$\pi/4$
1	0	$3\pi/4$
1	1	$-3\pi/4$
0	1	$-\pi/4$

The resulting signal constellation and phase transition are shown in Figure 6.1.3.1.9-1.

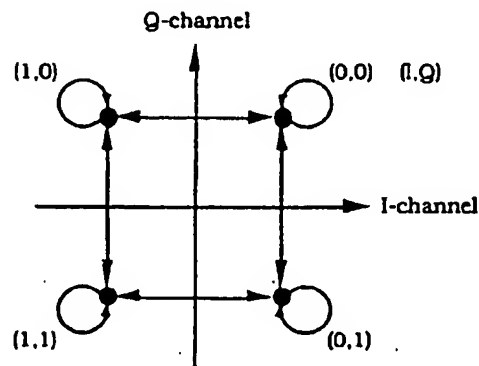


Figure 6.1.3.1.9-1. Reverse CDMA Channel Signal Constellation and Phase Transition



### 6.1.3.1.10 Baseband Filtering

Following the spreading operation, the I and Q impulses are applied to the inputs of the I and Q baseband filters as shown in Figure 6.1.3.1-2. The baseband filters shall have a frequency response  $S(f)$  that satisfies the limits given in Figure 6.1.3.1.10-1. Specifically, the normalized frequency response of the filter shall be contained within  $\pm\delta_1$  in the passband  $0 \leq f \leq f_p$  and shall be less than or equal to  $-\delta_2$  in the stopband  $f \geq f_s$ . The numerical values for the parameters are  $\delta_1 = 1.5$  dB,  $\delta_2 = 40$  dB,  $f_p = 590$  kHz, and  $f_s = 740$  kHz.

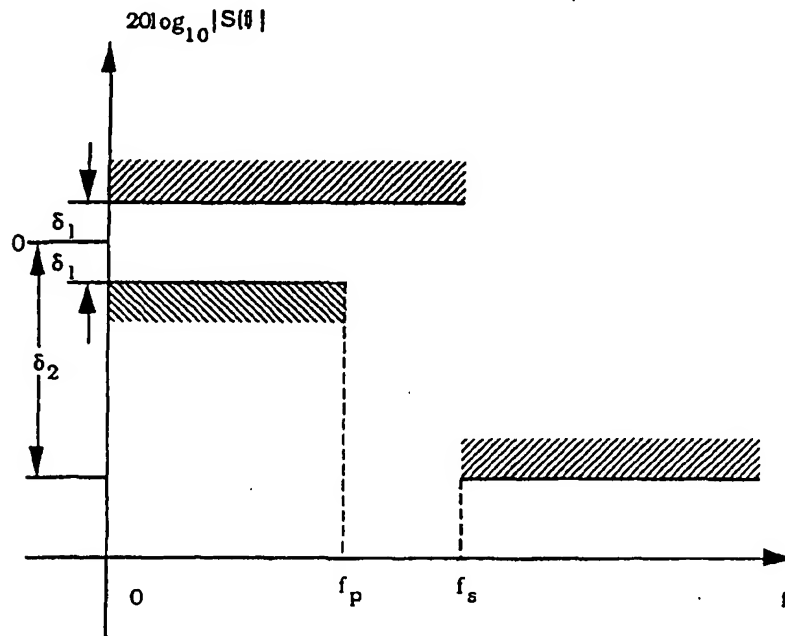


Figure 6.1.3.1.10-1. Baseband Filters Frequency Response Limits

Let  $s(t)$  be the impulse response of the baseband filter. Then  $s(t)$  should satisfy the following equation:

$$\text{Mean Squared Error} = \sum_{k=0}^{\infty} [\alpha s(kT_s - \tau) - h(k)]^2 \leq 0.03,$$

where the constants  $\alpha$  and  $\tau$  are used to minimize the mean squared error. The constant  $T_s$  is equal to 203.451... ns, which equals one quarter of a PN chip. The values of the coefficients  $h(k)$ , for  $k < 48$ , are given in Table 6.1.3.1.10-1;  $h(k) = 0$  for  $k \geq 48$ . Note that  $h(k)$  equals  $h(47 - k)$ .

Table 6.1.3.1.10-1. Coefficients  $h(k)$ 

$k$	$h(k)$
0.47	-0.025288315
1.46	-0.034167931
2.45	-0.035752323
3.44	-0.016733702
4.43	0.021602514
5.42	0.064938487
6.41	0.091002137
7.40	0.081884974
8.39	0.037071157
9.38	-0.021998074
10.37	-0.060716277
11.36	-0.051178658
12.35	0.007874526
13.34	0.084368728
14.33	0.126869306
15.32	0.094528345
16.31	-0.012839661
17.30	-0.143477028
18.29	-0.211829088
19.28	-0.140513128
20.27	0.094601918
21.26	0.441387140
22.25	0.785875640
23.24	1.0

### 6.1.3.2 Access Channel

The Access Channel is used by the mobile station to initiate communication with the base station and to respond to Paging Channel messages. An Access Channel transmission is a coded, interleaved, and modulated spread-spectrum signal. The Access Channel uses a random-access protocol (see 6.6.3.1.1). Access Channels are uniquely identified by their long codes (see 6.1.3.1.8).

#### 6.1.3.2.1 Access Channel Time Alignment and Modulation Rate

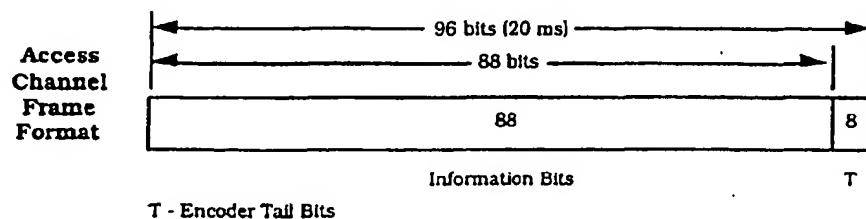
The mobile station shall transmit information on the Access Channel at a fixed data rate of 4800 bps. An Access Channel frame shall be 20 ms in duration. An Access Channel frame shall begin only when System Time is an integral multiple of 20 ms (see Figure 1.2-1).

The synchronization, timing, and structure of the Access Channel are specified in 6.6.3.1.1 and 6.7.1.1.

The Reverse CDMA Channel may contain up to 32 Access Channels numbered 0 through 31 per supported Paging Channel. At least one Access Channel exists on the Reverse CDMA Channel for each Paging Channel on the corresponding Forward CDMA Channel. Each Access Channel is associated with a single Paging Channel.

#### 6.1.3.2.2 Access Channel Frame Structure

Each Access Channel frame contains 96 bits (20 ms frame at 4800 bps). Each Access Channel frame shall consist of 88 information bits and eight Encoder Tail Bits (see Figure 6.1.3.2.2-1).



**Figure 6.1.3.2.2-1. Access Channel Frame Structure**

#### 6.1.3.2.2.1 Access Channel Preamble

The Access Channel preamble shall consist of frames of 96 zeros that are transmitted at the 4800 bps rate. The Access Channel preamble is transmitted to aid the base station in acquiring an Access Channel transmission (see 6.7.1.1).

#### 6.1.3.2.3 Access Channel Convolutional Encoding

The Access Channel data shall be convolutionally encoded as specified in 6.1.3.1.3.

1 When generating Access Channel data, the encoder shall be initialized to the all zero state  
2 at the end of each 20 ms frame.

3 6.1.3.2.4 Access Channel Code Symbol Repetition

4 Each code symbol output from the convolutional encoder on the Access Channel shall be  
5 repeated once (each code symbol occurs two consecutive times) as specified in 6.1.3.1.4.

6 6.1.3.2.5 Access Channel Interleaving

7 The repeated code symbols on the Access Channel shall be interleaved as specified in  
8 6.1.3.1.5.

9 6.1.3.2.6 Access Channel Modulation

10 The Access Channel data shall be modulated as specified in 6.1.3.1.6.

11 6.1.3.2.7 Access Channel Gating

12 The mobile station shall not gate off any power control group while transmitting on the  
13 Access Channel as specified in 6.1.3.1.7.1.

14 6.1.3.2.8 Access Channel Direct Sequence Spreading

15 The Access Channel shall be spread by the long code as specified in 6.1.3.1.8.

16 6.1.3.2.9 Access Channel Quadrature Spreading

17 The Access Channel shall be quadrature spread by the pilot PN sequences as specified in  
18 6.1.3.1.9.

19 6.1.3.2.10 Access Channel Baseband Filtering

20 The Access Channel shall be filtered as specified in 6.1.3.1.10.

21 6.1.3.3 Reverse Traffic Channel

22 The Reverse Traffic Channel is used for the transmission of user and signaling information  
23 to the base station during a call.

24 6.1.3.3.1 Reverse Traffic Channel Time Alignment and Modulation Rates

25 The mobile station shall transmit information on the Reverse Traffic Channel at variable  
26 data rates of 9600, 4800, 2400, and 1200 bps. The Reverse Traffic Channel frame shall be  
27 20 ms in duration. The data rate shall be selected on a frame-by-frame (i.e., 20 ms) basis.

28 A mobile station shall support staggered Traffic Channel frames. The time offset is  
29 specified by the FRAME\_OFFSET parameter<sup>5</sup>. A zero-offset Reverse Traffic Channel frame  
30 shall begin only when System Time is an integral multiple of 20 ms (see Figure 1.2-1). A  
31 staggered frame shall begin  $1.25 \times \text{FRAME\_OFFSET}$  ms later than the zero-offset Traffic

---

<sup>5</sup>The Reverse Traffic Channel time offset is the same as the Forward Traffic Channel time offset.

1 Channel frame. The Reverse Traffic Channel interleaver block shall be aligned with the  
2 Reverse Traffic Channel frame.

3 6.1.3.3.2 Reverse Traffic Channel Frame Structure

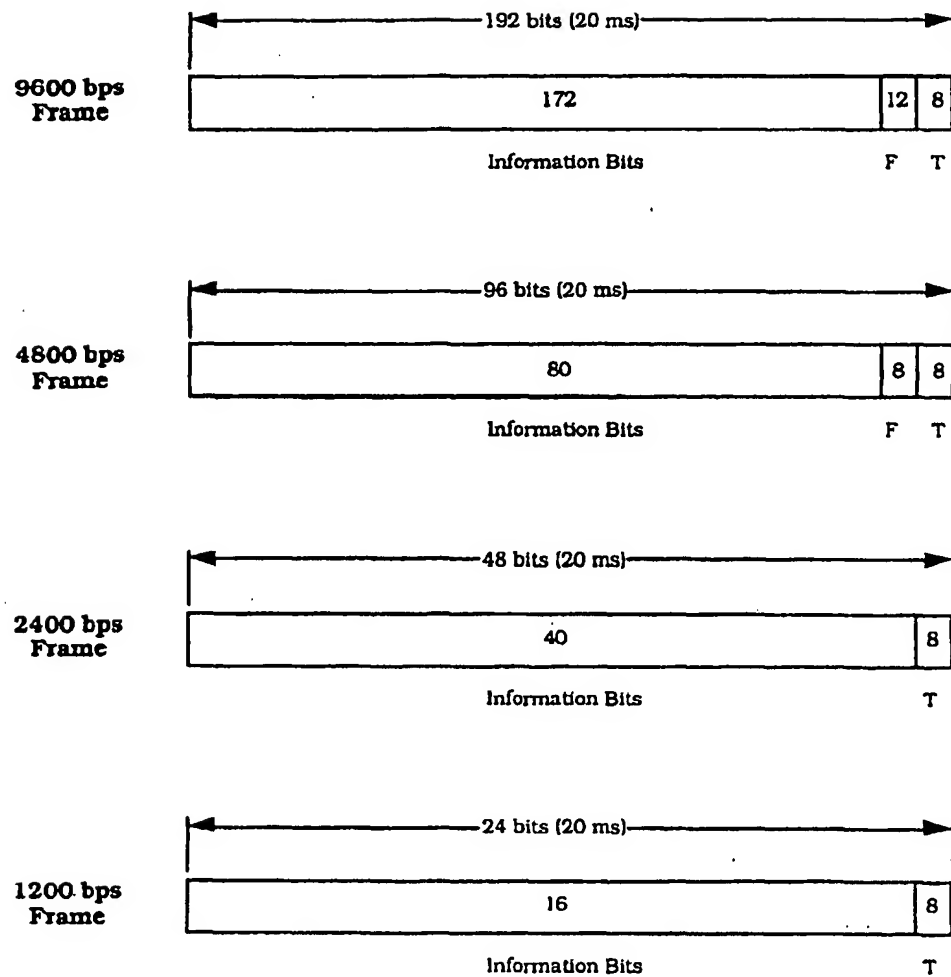
4 Reverse Traffic Channel frames sent at the 9600 bps transmission rate shall consist of 192  
5 bits. These 192 bits shall be composed of 172 information bits followed by 12 frame quality  
6 indicator (CRC) bits and eight Encoder Tail Bits as shown in Figure 6.1.3.3.2-1.

7 Reverse Traffic Channel frames sent at the 4800 bps transmission rate shall consist of 96  
8 bits. These 96 bits shall be composed of 80 information bits followed by eight frame quality  
9 indicator (CRC) bits and eight Encoder Tail Bits as shown in Figure 6.1.3.3.2-1.

10 Reverse Traffic Channel frames sent at the 2400 bps transmission rate shall consist of 48  
11 bits. These 48 bits shall be composed of 40 information bits followed by eight Encoder Tail  
12 Bits as shown in Figure 6.1.3.3.2-1.

13 Reverse Traffic Channel frames sent at the 1200 bps transmission rate shall consist of 24  
14 bits. These 24 bits shall be composed of 16 information bits followed by eight Encoder Tail  
15 Bits as shown in Figure 6.1.3.3.2-1.

16

**Notation**

F - Frame Quality Indicator (CRC)  
T - Encoder Tail Bits

**Figure 6.1.3.3.2-1. Reverse Traffic Channel Frame Structure**

#### 1 6.1.3.3.2.1 Reverse Traffic Channel Frame Quality Indicator

2 Each 9600 bps and 4800 bps frame shall include a frame quality indicator. This frame  
3 quality indicator is a CRC.<sup>6</sup> No frame quality indicator is used for the 2400 bps and 1200  
4 bps transmission rates.

5 For both the 9600 bps and 4800 bps rates, the frame quality indicator (CRC) shall be  
6 calculated on all bits within the frame, except the frame quality indicator itself and the  
7 Encoder Tail Bits. The 9600 bps transmission rate shall use a 12-bit frame quality  
8 indicator. The generator polynomial for this frame quality indicator shall be as follows:

$$9 \quad g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1.$$

10 The 4800 bps transmission rate shall use an 8-bit frame quality indicator. The generator  
11 polynomial for this frame quality indicator shall be as follows:

$$12 \quad g(x) = x^8 + x^7 + x^4 + x^3 + x + 1.$$

13 The frame quality indicators shall be computed according to the following procedure using  
14 the logic shown in Figures 6.1.3.3.2.1-1 and 6.1.3.3.2.1-2:

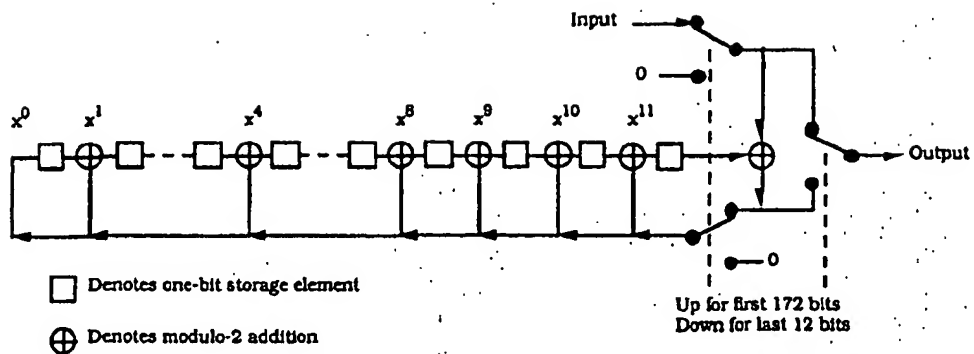
- 15 • Initially, all shift register elements shall be set to logical one and the switches shall  
16 be set in the up position.
- 17 • The register shall be clocked 172 times (for 192-bit frame) or 80 times (for 96-bit  
18 frame) with the information bits as input.
- 19 • The switches shall be set in the down position, and the register shall be clocked an  
20 additional 12 times (for 192-bit frame) or 8 times (for 96-bit frame). The 12 or 8  
21 additional output bits shall be the frame quality indicator bits.
- 22 • The bits shall be transmitted in the order calculated.

#### 23 6.1.3.3.2.2 Reverse Traffic Channel Encoder Tail Bits

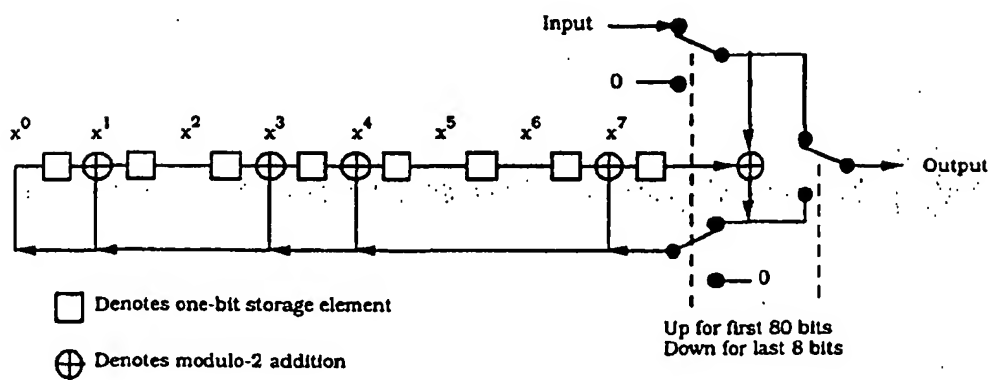
24 The last eight bits of each Reverse Traffic Channel frame are called the Encoder Tail Bits.  
25 These eight bits shall be set to '0'.

---

<sup>6</sup>The frame quality indicator supports two functions at the receiver. The first function is to determine whether the frame is in error. The second function is to assist in the determination of the data rate of the received frame. Other parameters may be needed for rate determination in addition to the frame quality indicator, such as symbol error rate evaluated at the four data rates.



**Figure 6.1.3.3.2.1-1. Reverse Traffic Channel Frame Quality Indicator Calculation at the 9600 bps Rate**



**Figure 6.1.3.3.2.1-2. Reverse Traffic Channel Frame Quality Indicator Calculation at the 4800 bps Rate**



1   6.1.3.3.2.3 Traffic Channel Preamble

2   The Traffic Channel preamble shall consist of frames of 192 zeros that are transmitted at  
3   the 9600 bps rate. The Traffic Channel preamble shall not include the frame quality  
4   indicator.

5   The Traffic Channel preamble is transmitted to aid the base station in performing  
6   acquisition of the Reverse Traffic Channel.

7   6.1.3.3.2.4 Null Traffic Channel Data

8   Null Traffic Channel data shall consist of frames of 16 ones followed by 8 zeros (the  
9   Encoder Tail Bits) sent at the 1200 bps rate.

10   The mobile station transmits null Traffic Channel data when no service option is active.  
11   Null Traffic Channel data serves as a "keep-alive" operation so that the base station can  
12   maintain connectivity with the mobile station.

13   6.1.3.3.3 Reverse Traffic Channel Convolutional Encoding

14   The Reverse Traffic Channel data shall be convolutionally encoded as specified in 6.1.3.1.3.

15   When generating Reverse Traffic Channel data, the encoder shall be initialized to the all  
16   zero state at the end of each 20 ms frame.

17   6.1.3.3.4 Reverse Traffic Channel Code Symbol Repetition

18   Reverse Traffic Channel code symbol repetition shall be as specified in 6.1.3.1.4.

19   6.1.3.3.5 Reverse Traffic Channel Interleaving

20   The code symbols (or repeated code symbols when a data rate lower than 9600 bps is used)  
21   on the Reverse Traffic Channel shall be interleaved as specified in 6.1.3.1.5.

22   6.1.3.3.6 Reverse Traffic Channel Modulation

23   The Reverse Traffic Channel data shall be modulated as specified in 6.1.3.1.6.

24   6.1.3.3.7 Reverse Traffic Channel Gating

25   The mobile station shall perform the data burst randomizing function as specified in  
26   6.1.3.1.7 while transmitting on the Reverse Traffic Channel.

27   6.1.3.3.8 Reverse Traffic Channel Direct Sequence Spreading

28   The Reverse Traffic Channel shall be spread by the long code as specified in 6.1.3.1.8.

29   6.1.3.3.9 Reverse Traffic Channel Quadrature Spreading

30   The Reverse Traffic Channel shall be quadrature spread by the pilot PN sequences as  
31   specified in 6.1.3.1.9.

1 6.1.3.3.10 Reverse Traffic Channel Baseband Filtering

2 The Reverse Traffic Channel shall be filtered as specified in 6.1.3.1.10.

3 6.1.3.3.11 Multiplex Option Information

4 Multiplex Option 1 is also referred to as the default multiplex option.<sup>7</sup> It provides for the  
5 transmission of primary traffic and signaling or secondary traffic. Signaling traffic may be  
6 transmitted via blank-and-burst with the signaling traffic using all of the frame or via dim-  
7 and-burst with the primary traffic and signaling traffic sharing the frame. Multiplex Option  
8 1 also supports the transmission of secondary traffic. When primary traffic is active,  
9 secondary traffic is transmitted via dim-and-burst with the primary traffic and secondary  
10 traffic sharing the frame. When primary traffic is not active, secondary traffic is  
11 transmitted via blank-and-burst with the secondary traffic using all of the frame. The  
12 information bit structures for primary and signaling traffic are specified in 6.1.3.3.11.1; the  
13 information bit structures for secondary traffic are specified in 6.1.3.3.11.2.  
14 Table 6.1.3.3.11-1 shows the information bit structures supported by Multiplex Option 1.

15 The mobile station shall support Multiplex Option 1. The mobile station shall support the  
16 transmission of primary traffic and signaling traffic using the information bit structures  
17 specified in 6.1.3.3.11.1. The mobile station may support secondary traffic, and if so, the  
18 mobile station shall also use the information bit structures specified in 6.1.3.3.11.2.  
19 Procedures for support of secondary traffic data are for further study.

20 Other multiplex options are for further study.

21

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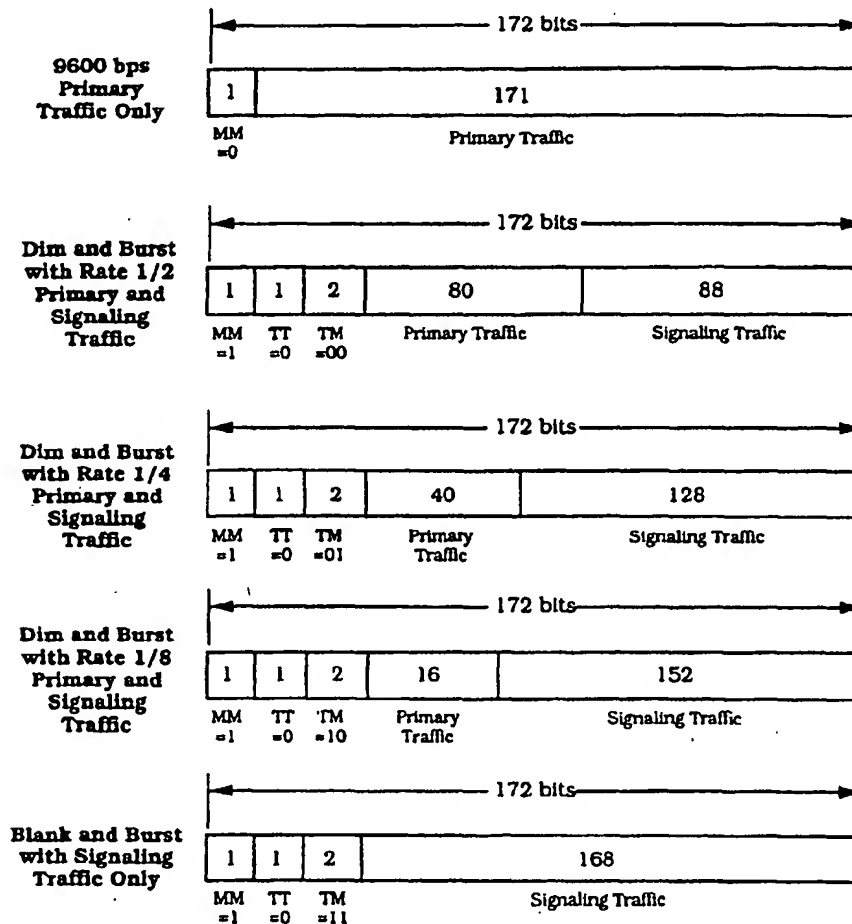
<sup>7</sup>The multiplex option is the same on both the Forward Traffic Channel and the Reverse Traffic Channel.

Table 6.1.3.3.11-1. Reverse Traffic Channel Information Bits for Multiplex Option 1

Transmit Rate (bits/sec)	Format Bits			Primary Traffic	Signaling Traffic	Secondary Traffic
	Mixed Mode (MM)	Traffic Type (TT)	Traffic Mode (TM)	bits/frame	bits/frame	bits/frame
9600	'0'	-	-	171	0	0
	'1'	'0'	'00'	80	88	0
	'1'	'0'	'01'	40	128	0
	'1'	'0'	'10'	16	152	0
	'1'	'0'	'11'	0	168	0
	* '1'	'1'	'00'	80	0	88
	* '1'	'1'	'01'	40	0	128
	* '1'	'1'	'10'	16	0	152
	* '1'	'1'	'11'	0	0	168
4800	-	-	-	80	0	0
2400	-	-	-	40	0	0
1200	-	-	-	16	0	0

Note: Secondary traffic structures, marked with \*, are optional.

- 1 6.1.3.3.11.1 Primary and Signaling Traffic with Multiplex Option 1  
 2 The mobile station shall support the information bit structures described in  
 3 Table 6.1.3.3.11-1 and Figure 6.1.3.3.11.1-1.  
 4



#### Notation

MM - Mixed Mode Bit  
 0 - Primary Traffic Only  
 1 - Primary Traffic and/or Signaling Traffic or Secondary Traffic

TT - Traffic Type Bit  
 0 - Signaling Traffic  
 1 - Secondary Traffic

TM - Traffic Mode Bits  
 00 - 80 Primary Traffic Bits and either 88 Signaling Traffic or 88 Secondary Traffic Bits  
 01 - 40 Primary Traffic Bits and either 128 Signaling Traffic Bits or 128 Secondary Traffic Bits  
 10 - 16 Primary Traffic Bits and either 152 Signaling Traffic Bits or 152 Secondary Traffic Bits  
 11 - 168 Signaling Traffic Bits or 168 Secondary Traffic Bits

5  
 6 **Figure 6.1.3.3.11.1-1. Information Bits for Primary Traffic and Signaling Traffic**  
 7 **(Part 1 of 2)**

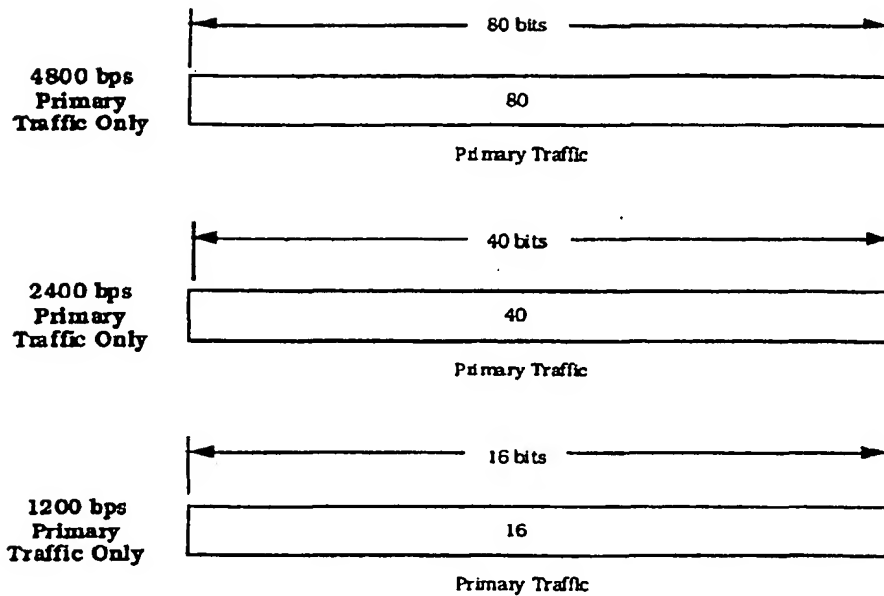
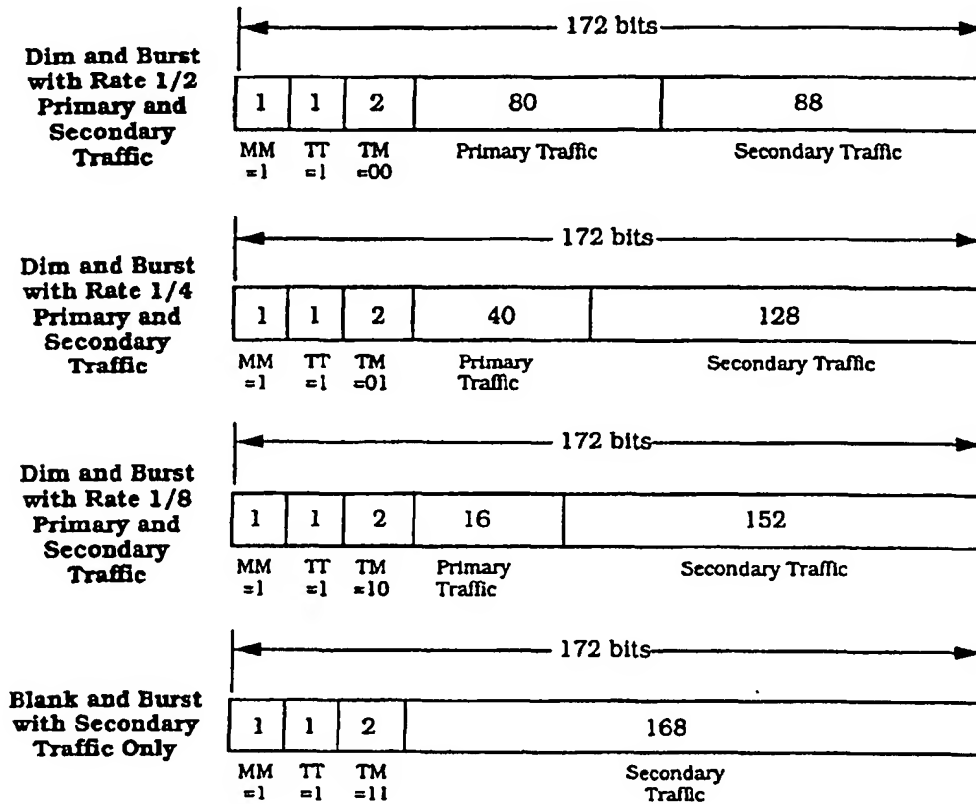


Figure 6.1.3.3.11.1-1. Information Bits for Primary Traffic and Signaling Traffic  
(Part 2 of 2)

## 6.1.3.3.11.2 Secondary Traffic with Multiplex Option 1

If the mobile station supports secondary traffic, the mobile station shall use the information bit structures described in Table 6.1.3.3.11-1 and Figure 6.1.3.3.11.2-1.



## Notation

MM - Mixed Mode Bit

0 - Primary Traffic Only  
1 - Primary Traffic and/or  
Signaling Traffic or  
Secondary Traffic

TT - Traffic Type Bit

0 - Signaling Traffic  
1 - Secondary Traffic

TM - Traffic Mode Bits

00 - 80 Primary Traffic Bits and either  
88 Signaling Traffic or  
88 Secondary Traffic Bits  
01 - 40 Primary Traffic Bits and either  
128 Signaling Traffic Bits or  
128 Secondary Traffic Bits  
10 - 16 Primary Traffic Bits and either  
152 Signaling Traffic Bits or  
152 Secondary Traffic Bits  
11 - 168 Signaling Traffic Bits or  
168 Secondary Traffic Bits

Figure 6.1.3.3.11.2-1. Information Bits for Secondary Traffic

6.1.3.3.11.3 Use of Various Information Bit Formats for Multiplex Option 1

When neither a primary traffic service option nor a secondary traffic service option is active, the mobile station shall transmit signaling traffic using only blank-and-burst frames. When not transmitting signaling traffic, the mobile station shall transmit only null Traffic Channel data frames.

When a primary traffic service option is active and a secondary traffic service option is not active, the mobile station shall use the information formats specified in 6.1.3.3.11.1. The mobile station shall not transmit null Traffic Channel data. The mobile station should use the dim-and-burst information formats specified in 6.1.3.3.11.1 for signaling traffic.

When a primary traffic service option is not active and a secondary traffic service option is active, the mobile station shall use the information formats specified in 6.1.3.3.11.2 to transmit secondary traffic. The mobile station shall use the blank-and-burst format specified in 6.1.3.3.11.1 for signaling traffic. The mobile station shall transmit null Traffic Channel data when neither secondary traffic nor signaling traffic is to be sent.

When both a primary traffic service option and a secondary traffic service option are active, the mobile station shall use the information formats specified in 6.1.3.3.11.1 and 6.1.3.3.11.2. The mobile station shall not transmit null Traffic Channel data. The mobile station should use the dim-and-burst information formats specified in 6.1.3.3.11.1 and 6.1.3.3.11.2 for signaling traffic.

6.1.3.3.11.4 Control of Service Options for Multiplex Option 1

Multiplex Option 1 controls the number of bits that the service option supplies for a frame (see IS-96 "Speech Service Option Standard for Wideband Spread Spectrum Digital Cellular System").

The mobile station shall use the following rules when a primary traffic service option is active: If signaling traffic is to be transmitted in a frame, Multiplex Option 1 shall either restrict the primary traffic service option to generate zero bits (for a blank-and-burst frame) or to generate less than 171 bits (for a dim-and-burst frame). If secondary traffic is to be transmitted in a frame, Multiplex Option 1 may restrict the primary traffic service option to generate less than 171 bits but shall allow the primary traffic service option to generate at least 16 bits. In all other cases, Multiplex Option 1 shall allow the primary traffic service option to generate either 16, 40, 80, or 171 bits for a frame.

6.1.4 Limitations on Emissions

6.1.4.1 Bandwidth Occupied

Modulation products in a bandwidth of 30 kHz centered  $\pm 900$  kHz from the channel center frequency should be at least 45 dB and shall be at least 42 dB below the mean output power level.

#### 6.1.4.2 Conducted Spurious Emissions

The mobile station shall meet the spurious emissions requirements at all transmit power levels. The mobile station shall meet the spurious emission requirements with an inoperative antenna assembly.

##### 6.1.4.2.1 Suppression Inside Cellular Band

When transmitting on any CDMA Channel, spurious emission levels in the mobile station transmit band between 824 and 849 MHz shall be less than the limits specified in Table 6.1.4.2.1-1.

In addition, spurious emissions in each 1.23 MHz band located anywhere in the mobile station receive band between 869 and 894 MHz shall be less than -80 dBm. These requirements shall apply to measurements made at the mobile station antenna connector.

**Table 6.1.4.2.1-1. Spurious Emission Limits When Transmitting**

For Frequency Offset $\Delta f$ , with $ \Delta f $	Greater than 885.0 kHz	Greater than 1.98 MHz
Spurious emission levels shall not exceed (a), or both (b) and (c), whichever is the greater power.	(a) -42 dBc/30 kHz	(a) -54 dBc/30 kHz
	(b) -60 dBm/30 kHz	(b) -60 dBm/30 kHz
	(c) -54 dBm/1.23 MHz	(c) -54 dBm/1.23 MHz
Spurious emission levels should not exceed (a), or both (b) and (c), whichever is the greater power.	(a) -45 dBc/30 kHz	(a) -60 dBc/30 kHz
	(b) -66 dBm/30 kHz	(b) -66 dBm/30 kHz
	(c) -60 dBm/1.23 MHz	(c) -60 dBm/1.23 MHz

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on  $|\Delta f|$  where  $\Delta f$  = center frequency - measurement frequency

##### 6.1.4.2.2 Suppression Outside Cellular Band

Current FCC rules shall apply.

#### 6.1.4.3 Radiated Spurious Emissions

Radiated spurious emissions (from sources other than the antenna connector) shall meet levels corresponding to the conducted spurious requirements listed in 6.1.4.2.

#### 6.1.5 Synchronization and Timing

##### 6.1.5.1 Time Reference

Figure 1.2-1 illustrates the nominal relationship between the mobile station and base station transmit and receive time references. The mobile station shall establish a time reference which is used to derive timing for the transmit chip, symbol, frame slot, and system timing. The mobile station time reference shall be, in steady state conditions,



1 within  $\pm 1 \mu\text{s}$  of the time of occurrence, as measured at the mobile station antenna  
2 connector, of the earliest arriving multipath component being used for demodulation. If  
3 another multipath component (belonging to the same Pilot Channel or to a different Pilot  
4 Channel) becomes the earliest arriving multipath component to be used, the mobile station  
5 time reference shall track to the new component. If the difference between the mobile  
6 station time reference and the time of occurrence of the earliest arriving multipath  
7 component being used for demodulation, as measured at the mobile station antenna  
8 connector, is less than  $\pm 1 \mu\text{s}$ , the mobile station may track its time reference to the earliest  
9 arriving multipath component being used for demodulation.

10 If a mobile station time reference correction is needed, it shall be corrected no faster than  
11  $1/4$  chip (203.451 ns) in any 200 ms period and no slower than  $3/8$  PN chip (305.18 ns)  
12 per second.

13 When receiving the Forward Traffic Channel, the mobile station time reference shall be used  
14 as the transmit time of the Reverse Traffic Channel. When receiving the Paging Channel,  
15 the mobile station time reference shall be used as the transmit time of the Access Channel.

#### 16 6.1.6 Transmitter Performance Requirements

17 System performance is predicated on transmitters meeting the requirements set forth in  
18 IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread  
19 Spectrum Cellular Mobile Stations."

### 20 6.2 Receiver

#### 21 6.2.1 Frequency Parameters

##### 22 6.2.1.1 Channel Spacing and Designation

23 Channel spacing and designation for the mobile station reception shall be as specified in  
24 2.1.1.1. Valid channels for CDMA operations shall be as specified in 6.1.1.1.

#### 25 6.2.2 Demodulation Characteristics

##### 26 6.2.2.1 Processing

27 The mobile station demodulation process shall perform complementary operations to the  
28 base station modulation process on the Forward CDMA Channel (see 7.1.3).

29 The mobile station shall provide a minimum of four processing elements that can be  
30 directed independently from each other. At least three elements shall be capable of  
31 tracking and demodulating multipath components of the Forward CDMA Channel. At least  
32 one element shall be a "searcher" element capable of scanning and estimating the signal  
33 strength at each pilot PN sequence offset.

#### 6.2.2.2 Forward Traffic Channel Frame Categorization for Multiplex Option 1

For multiplex option 1, the mobile station shall classify received Forward Traffic Channel frames into the following 14 categories (see 7.1.3.5.11):

1. 9600 bps frame, primary traffic only
2. 9600 bps frame, dim-and-burst with Rate 1/2 primary and signaling traffic
3. 9600 bps frame, dim-and-burst with Rate 1/4 primary and signaling traffic
4. 9600 bps frame, dim-and-burst with Rate 1/8 primary and signaling traffic
5. 9600 bps frame, blank-and-burst with signaling traffic only
6. 4800 bps frame, primary traffic only
7. 2400 bps frame, primary traffic only
8. 1200 bps frame, primary traffic or null data only
9. 9600 bps frame, primary traffic only, with bit errors<sup>8</sup>
10. Frame with insufficient frame quality<sup>9</sup>
11. 9600 bps frame, dim-and-burst with Rate 1/2 primary and secondary traffic
12. 9600 bps frame, dim-and-burst with Rate 1/4 primary and secondary traffic
13. 9600 bps frame, dim-and-burst with Rate 1/8 primary and secondary traffic
14. 9600 bps frame, blank-and-burst with secondary traffic only

Frames in categories 9 and 10 are bad frames; all frames otherwise categorized are considered good frames.

If primary traffic is active and secondary traffic is not active, then the mobile station shall categorize the received frames into one of categories 1 through 10. If primary traffic is not active and secondary traffic is active, then the mobile station shall categorize the received frames into one of categories 5, 8, 10 and 14. If neither primary traffic nor secondary traffic is active, then the mobile station shall categorize the received frames into one of categories 5, 8, and 10. Mobile stations that do not implement secondary traffic services are not required to implement categories 11 through 14.

#### 6.2.2.3 Forward Traffic Channel Time Alignment

The Forward Traffic Channel frame time alignment is specified in 7.1.3.5.1. A mobile station shall support staggered Forward Traffic Channel frames.

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<sup>8</sup>Certain service options, which can be connected to the multiplex sublayer, can satisfactorily handle some bit errors. This category is used when the frame quality indicator (CRC) fails but other parameters indicate a 9600 bps frame has been received.

<sup>9</sup>This category is used when the mobile station is unable to decide upon the data rate of the received frame or when the mobile station detects a frame in error which does not belong to category 9.

1   **6.2.3 Limitations on Emissions**

2   **6.2.3.1 Conducted Spurious Emissions**

3   **6.2.3.1.1 Suppression Inside Cellular Band**

4   Total spurious emissions in each 1.23 MHz band located anywhere in the mobile station  
5   receive band between 869 and 894 MHz shall be less than -80 dBm. Total spurious  
6   emissions in each 1.23 MHz band located anywhere in the mobile station's transmit band  
7   between 824 and 849 MHz shall not exceed -60 dBm. These requirements shall apply to  
8   measurements made at the mobile station antenna connector, with the transmitter  
9   disabled.

10   **6.2.3.1.2 Suppression Outside Cellular Band**

11   Current FCC rules shall apply.

12   **6.2.3.2 Radiated Spurious Emissions**

13   Current FCC rules shall apply.

14   **6.2.4 Receiver Performance Requirements**

15   System performance is predicated on receivers meeting the requirements set forth in IS-98  
16   "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread  
17   Spectrum Cellular Mobile Stations."

18   **6.3 Security and Identification**

19   **6.3.1 Mobile Station Identification Number**

20   Mobile stations operating in the analog mode are identified by the mobile identification  
21   number (MIN) (see 2.3.1).

22   Mobile stations are identified by the International Mobile Station Identity (IMSI).<sup>10</sup> The  
23   IMSI consists of up to 15 numerical characters (0-9). The first three digits of the IMSI are  
24   the mobile country code (MCC), and the remaining digits are the national mobile station  
25   identity (NMSI). The NMSI consists of the mobile network code (MNC) and the mobile  
26   station identification number (MSIN). The IMSI structure is shown in Figure 6.3.1-1.

27

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<sup>10</sup>See CCITT Blue Book, Volume II-Fascicle II.2, Recommendation E.212, November 1988.

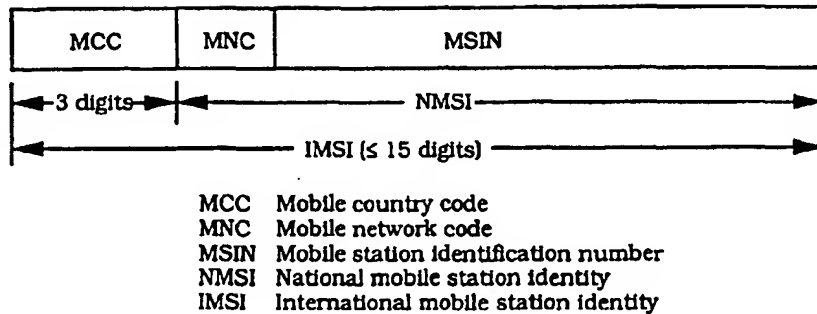


Figure 6.3.1-1. IMSI Structure

An IMSI that is 15 digits in length is called a class 0 IMSI (the NMSI is 12 digits in length); an IMSI that is less than 15 digits in length is called a class 1 IMSI (the NMSI is less than 12 digits in length).

The IMSI\_S is a 10-digit (34-bit) number derived from the IMSI. When the IMSI has ten or more digits, IMSI\_S is equal to the last ten digits. When the IMSI has fewer than ten digits, the least significant digits of IMSI\_S are equal to the IMSI and zeros are added to the most significant side to obtain a total of ten digits. The 10-digit IMSI\_S consists of 3- and 7-digit parts, called IMSI\_S2 and IMSI\_S1, respectively, as illustrated in Figure 6.3.1-2. IMSI\_S is mapped into a 34-bit number (see 6.3.1.1).

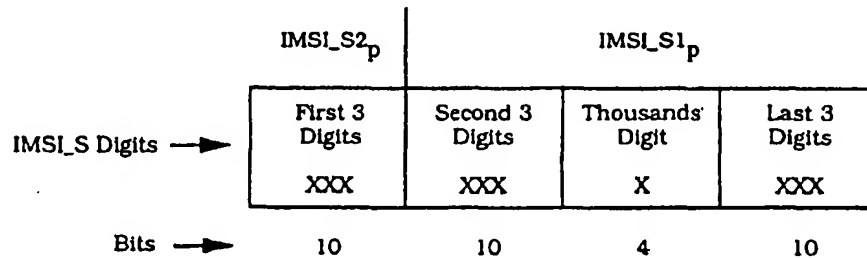


Figure 6.3.1-2. IMSI\_S Binary Mapping

IMSI\_11\_12 is encoded as described in 6.3.1.2; the 3-digit MCC is encoded as described in 6.3.1.3.

When the IMSI has 12 or more digits, IMSI\_11\_12 is equal to the 11th and 12th digits of the IMSI. When the IMSI has fewer than 12 digits, digits with a value equal to zero are added to the most significant side to obtain a total of 12 digits. IMSI\_11\_12 is equal to the 11th and 12th digits of the number.

For CDMA operation, the same IMSI may be entered into multiple mobile stations. Individual systems may or may not allow these capabilities. The management of these capabilities is a function of the base station and system operator.

The mobile station shall have memory to store the 10-bit  $MCC_p$ , the 7-bit  $IMSI_{11\_12_p}$ , and the 34-bit  $IMSI_S_p$ .  $IMSI_S_p$  may be represented by the 10-bit  $IMSI_{S2_p}$  and the 24 bit  $IMSI_{S1_p}$ . If the mobile station has a class 1 IMSI, it shall have memory to store  $IMSI\_ADDR\_NUM_p$ .  $IMSI\_ADDR\_NUM_p$  is equal to the number of digits in the NMSI minus four.

#### 6.3.1.1 Encoding of $IMSI_S$

The  $IMSI_S$  binary mapping is defined as follows:

1. The first three digits of the  $IMSI_S$  are mapped into ten bits (corresponding to  $IMSI_{S2_p}$ ) by the following coding algorithm:
  - a. Represent these three digits as  $D_1 D_2 D_3$  with the digit equal to zero being given the value of ten.
  - b. Compute  $100 \times D_1 + 10 \times D_2 + D_3 - 111$ .
  - c. Convert the result in step b to binary by the standard decimal-to-binary conversion as described in Table 6.3.1.1-1.

Table 6.3.1.1-1. Decimal to Binary Conversion Table

Decimal Number	Binary Number
0	0000000000
1	0000000001
2	0000000010
3	0000000011
4	0000000100
.	.
.	.
.	.
998	1111100110
999	1111100111

2. The second three digits of the  $IMSI_S$  are mapped into the ten most significant bits of  $IMSI_{S1_p}$  by the coding algorithm described in 1.
3. The last four digits of the  $IMSI_S$  are mapped into the 14 least significant bits of  $IMSI_{S1_p}$  as follows:
  - a. The thousands digit is mapped into four bits by a Binary-Coded-Decimal (BCD) conversion, as specified in Table 6.3.1.1-2.

- b. The last three digits are mapped into ten bits by the coding algorithm described in 1.

Table 6.3.1.1-2. BCD Mapping

Decimal Number	Binary Number
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
0	1010

The following example illustrates this IMSI\_S<sub>2p</sub> and IMSI\_S<sub>1p</sub> calculation procedure. Let the IMSI be the 9-digit number 123456789. Since the IMSI has fewer than ten digits, the nine least significant digits of the IMSI\_S are equal to the IMSI digits and the most significant IMSI\_S digit is set to zero. So the 10-digit IMSI\_S is 012 345 6 789. IMSI\_S<sub>2p</sub> and IMSI\_S<sub>1p</sub> are calculated as follows:

- IMSI\_S<sub>2p</sub>. The ten-bit IMSI\_S<sub>2p</sub> is derived from the first three digits of the IMSI\_S (i.e., 012):

a.  $D_1 = 10; D_2 = 1; D_3 = 2.$

b.  $100 \times D_1 + 10 \times D_2 + D_3 - 111 = 100 \times 10 + 10 \times 1 + 2 - 111 = 901.$

c. 901 in binary is '11 1000 0101'.

Therefore, IMSI\_S<sub>2p</sub> is '11 1000 0101'.

- IMSI\_S<sub>1p</sub>. The ten most significant bits of IMSI\_S<sub>1p</sub> are derived from the second three digits of the IMSI\_S (i.e., 345):

a.  $D_1 = 3; D_2 = 4; D_3 = 5.$

b.  $100 \times D_1 + 10 \times D_2 + D_3 - 111 = 100 \times 3 + 10 \times 4 + 5 - 111 = 234.$

c. 234 in binary is '0011 1010 10'.

The next four most significant bits of IMSI\_S<sub>1p</sub> are derived from the thousands digit of the IMSI\_S (i.e., 6) by BCD conversion:

6 in BCD is '0110'.

1 The ten least significant bits of IMSI\_S1<sub>P</sub> are derived from the last three digits of the IMSI\_S  
2 (i.e., 789):

- 3 a.  $D_1 = 7; D_2 = 8; D_3 = 9.$
- 4 b.  $100 \times D_1 + 10 \times D_2 + D_3 - 111 = 100 \times 7 + 10 \times 8 + 9 - 111 = 678.$
- 5 c. 678 in binary is '10 1010 0110'.

6 Therefore, IMSI\_S1<sub>P</sub> is '0011 1010 1001 1010 1010 0110'.

#### 7 6.3.1.2 Encoding of IMSI\_11\_12

8 The IMSI\_11\_12 binary mapping is defined as follows:

- 9 1. Represent the 11th digit as  $D_{11}$  and the 12th digit as  $D_{12}$  with the digit equal to  
10 zero being given the value of ten.
- 11 2. Compute  $10 \times D_{12} + D_{11} - 11.$
- 12 3. Convert the result in step 2 to binary by a standard decimal-to-binary  
13 conversion as described in Table 6.3.1.1-1 and limit the resulting number to the  
14 7 least significant bits.

#### 15 6.3.1.3 Encoding of the MCC

16 The MCC binary mapping is defined as follows:

- 17 1. Represent the 3-digit mobile country code as  $D_1 D_2 D_3$  with the digit equal to  
18 zero being given the value of ten.
- 19 2. Compute  $100 \times D_1 + 10 \times D_2 + D_3 - 111.$
- 20 3. Convert the result in step (2) to binary by a standard decimal-to-binary  
21 conversion as described in Table 6.3.1.1-1.

#### 22 6.3.2 Electronic Serial Number

23 See 2.3.2.

#### 24 6.3.3 Station Class Mark

25 See 2.3.3.

#### 26 6.3.4 Registration Memory

27 See 2.3.4 for registration memory when operating in the analog mode.

28 The mobile station shall have memory to store one element in the zone-based registration  
29 list ZONE\_LIST<sub>s-p</sub> (see 6.6.5.1.5 and 6.6.5.5). This stored element shall include both  
30 REG\_ZONE and the corresponding (SID, NID) pair. The data retention time under power-off  
31 conditions shall be at least 48 hours. If, after 48 hours, the data integrity cannot be  
32 guaranteed, then the entry in ZONE\_LIST<sub>s-p</sub> shall be deleted upon power-on.

33 The mobile station shall have memory to store one element in the system/network  
34 registration list SID\_NID\_LIST<sub>s-p</sub> (see 6.6.5.1.5 and 6.6.5.5). The data retention time under  
35 power-off conditions shall be at least 48 hours. If, after 48 hours, the data integrity cannot  
36 be guaranteed, then the entry in SID\_NID\_LIST<sub>s-p</sub> shall be deleted upon power-on.

1 The mobile station shall have memory to store the distance-based registration variables  
 2 BASE\_LAT\_REG<sub>s-p</sub>, BASE\_LONG\_REG<sub>s-p</sub>, and REG\_DIST\_REG<sub>s-p</sub> (see 6.6.5.1.4 and  
 3 6.6.5.5). The data retention time under power-off conditions shall be at least 48 hours. If,  
 4 after 48 hours, the data integrity cannot be guaranteed, then REG\_DIST\_REG<sub>s-p</sub> shall be  
 5 set to zero upon power-on.

#### 6 6.3.5 Access Overload Class

7 The 4-bit overload class indicator (ACCOLC<sub>p</sub>) is used to identify which overload class  
 8 controls access attempts by the mobile station and is used to identify redirected overload  
 9 classes in global service redirection. See 2.3.5.

10 For mobile stations that are classified as overload classes ACCOLC 0 through ACCOLC 9,  
 11 the mobile station's 4-bit access overload class indicator (ACCOLC<sub>p</sub>) shall be automatically  
 12 derived from the last digit of the associated decimal representation of the IMSI by a decimal  
 13 to binary conversion as specified in Table 6.3.5-1. When a mobile station's IMSI is  
 14 updated, its 4-bit field ACCOLC<sub>p</sub> shall be automatically reset to the last digit of the decimal  
 15 representation of the new IMSI by the mapping specified in Table 6.3.5-1. Programming the  
 16 4-bit ACCOLC<sub>p</sub> for overload classes ACCOLC 10 through ACCOLC 15 as specified in  
 17 Table 6.3.5-2 shall require a special facility only available to equipment manufacturers and  
 18 system operators. The content of ACCOLC<sub>p</sub> shall not be visible through the mobile  
 19 station's display.

20 Before a mobile station has been assigned a IMSI for the first time, the 4-bit ACCOLC<sub>p</sub> field  
 21 shall be set according to a uniform distribution between '0000' and '1001'.

22

23 Table 6.3.5-1. ACCOLC<sub>p</sub> Mapping for ACCOLC 0 through ACCOLC 9

Last Digit of the Decimal Representation of the IMSI	ACCOLC <sub>p</sub>
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001

24



Table 6.3.5-2. ACCOLC<sub>p</sub> Mapping for ACCOLC 10 through ACCOLC 15

Overload Class	ACCOLC <sub>p</sub>
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111

6.3.6 Reserved

6.3.7 Reserved

6.3.8 Home System and Network Identification

In addition to the HOME\_SID<sub>p</sub> parameter that the mobile station stores for analog operation (see 2.3.8), the mobile station shall provide memory to store at least one home (SID<sub>p</sub>, NID<sub>p</sub>) pair. The mobile station shall also provide memory to store the 1-bit parameters MOB\_TERM\_HOME<sub>p</sub>, MOB\_TERM\_FOR\_SID<sub>p</sub>, and MOB\_TERM\_FOR\_NID<sub>p</sub> (see 6.6.5.3).

6.3.9 Local Control Option

See 2.3.9.

6.3.10 Preferred Operation Selection

6.3.10.1 Preferred System

See 2.3.10.1.

6.3.10.2 Preferred CDMA or Analog

See 2.3.10.2.

6.3.11 Discontinuous Reception

The mobile station shall provide memory to store the preferred slot cycle index, SLOT\_CYCLE\_INDEX<sub>p</sub> (see 6.6.2.1.1.3.2).

6.3.12 Authentication, Encryption of Signaling Information/User Data and Voice Privacy

6.3.12.1 Authentication

Authentication is the process by which information is exchanged between a mobile station and base station for the purpose of confirming the identity of the mobile station. A

- 1 successful outcome of the authentication process occurs only when it can be demonstrated  
 2 that the mobile station and base station possess identical sets of shared secret data.
- 3 The authentication algorithms are described in "Common Cryptographic Algorithms." The  
 4 interface (input and output parameters) for the algorithms is described in "Interface  
 5 Specification for Common Cryptographic Algorithms." Table 6.3.12.1-1 summarizes the  
 6 setting of the input parameters of the Auth\_Signature procedure for each of its uses in this  
 7 standard.

Table 6.3.12.1-1. Auth\_Signature Input Parameters

Procedure	RAND_CHALLENGE	ESN	AUTH_· DATA	SSD_· AUTH	SAVE_· REGISTERS
Registration (6.3.12.1.4)	RAND <sub>s</sub>	ESN <sub>p</sub>	IMSI_S1	SSD_A	FALSE
Unique Challenge (6.3.12.1.5)	RANDU and 8 LSBs of IMSI_S2	ESN <sub>p</sub>	IMSI_S1	SSD_A	FALSE
Originations (6.3.12.1.6)	RAND <sub>s</sub>	ESN <sub>p</sub>	Digits	SSD_A	TRUE
Terminations (6.3.12.1.7)	RAND <sub>s</sub>	ESN <sub>p</sub>	IMSI_S1	SSD_A	TRUE
Mobile Station Data Bursts (6.3.12.1.8)	RAND <sub>s</sub>	ESN <sub>p</sub>	Digits	SSD_A	FALSE
Base Station Challenge (6.3.12.1.9)	RANDBS	ESN <sub>p</sub>	IMSI_S1	SSD_A_· NEW	FALSE

10

## 11 6.3.12.1.1 Shared Secret Data (SSD)

- 12 SSD is a 128-bit quantity that is stored in semi-permanent memory in the mobile station,  
 13 as specified in 2.3.12.1.1.

- 14 SSD\_A is used to support the authentication procedures and SSD\_B is used to support  
 15 voice privacy and message encryption. SSD is generated according to the procedure  
 16 specified in 2.3.12.1.8 or 6.3.12.1.9. The SSD shall not be accessible to the user.

## 17 6.3.12.1.2 Random Challenge Memory (RAND)

- 18 See 2.3.12.1.2.

19 6.3.12.1.3 Call History Parameter (COUNT<sub>s-p</sub>)

- 20 See 2.3.12.1.3.

#### 6.3.12.1.4 Authentication of Mobile Station Registrations

The following authentication procedures shall be performed when  $AUTH_S$  is set to '01' (standard authentication mode), and the mobile station attempts to register (by sending a *Registration Message* on the Access Channel).

The mobile station shall set the input parameters of the Auth\_Signature procedure (see "Interface Specification for Common Cryptographic Algorithms," section 2.3) as illustrated in Figure 6.3.12.1.4-1.

The mobile station shall set the SAVE\_REGISTERS input parameter to FALSE.

The mobile station shall then execute the Auth\_Signature procedure. The 18-bit output AUTH\_SIGNATURE shall be used to fill the AUTHR field of the *Registration Message*. The RANDC (eight most significant bits of RAND) and COUNT fields of the message shall be filled with the current values stored in the mobile station.

The base station compares the received value of RANDC to the most significant eight bits of its internally stored value of RAND.

The base station may also compare the received value of COUNT with its internally stored value associated with the received IMSI/ESN.

The base station computes the value of AUTHR in the same manner as the mobile station, but using its internally stored value of SSD\_A. The base station compares its computed value of AUTHR to the value received from the mobile station.

If any of the comparisons fail, the base station may deem the registration attempt unsuccessful, initiate the Unique Challenge-Response Procedure (see 6.3.12.1.5) or commence the process of updating SSD (see 6.3.12.1.9).

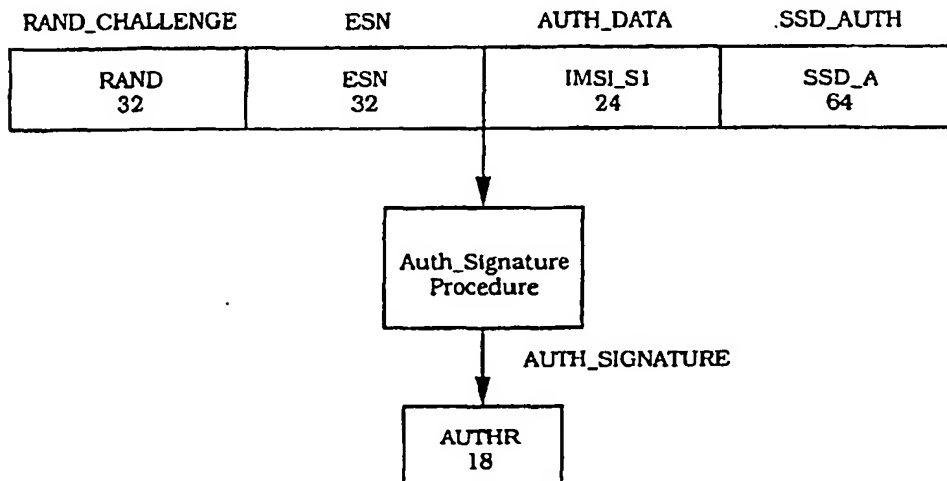


Figure 6.3.12.1.4-1. Computation of AUTHR for Authentication of Mobile Station Registrations

### 6.3.12.1.5 Unique Challenge-Response Procedure

The Unique Challenge-Response Procedure is initiated by the base station and can be carried out either on the Paging and Access Channels, or on the Forward and Reverse Traffic Channels. The procedure is as follows:

The base station generates the 24-bit quantity RANDU and sends it to the mobile station in the *Authentication Challenge Message* on either the Paging Channel or the Forward Traffic Channel. Upon receipt of the *Authentication Challenge Message*, the mobile station shall set the input parameters of the Auth\_Signature procedure (see "Interface Specification for Common Cryptographic Algorithms," section 2.3) as illustrated in Figure 6.3.12.1.5-1. The 24 most significant bits of the RAND\_CHALLENGE input parameter shall be filled with RANDU, and the 8 least significant bits of RAND\_CHALLENGE shall be filled with the 8 least significant bits of IMSI\_S2.

The mobile station shall set the SAVE\_REGISTERS input parameter to FALSE.

The mobile station shall then execute the Auth\_Signature procedure. The 18-bit output AUTH\_SIGNATURE shall be used to fill the AUTHU field of the *Authentication Challenge Response Message*, which shall be sent to the base station.

The base station computes the value of AUTHU in the same manner as the mobile station, but using its internally stored value of SSD\_A. The base station compares its computed value of AUTHU to the value received from the mobile station. If the comparison fails, the base station may deny further access attempts by the mobile station, drop the call in progress, or initiate the process of updating SSD (see 6.3.12.1.9).

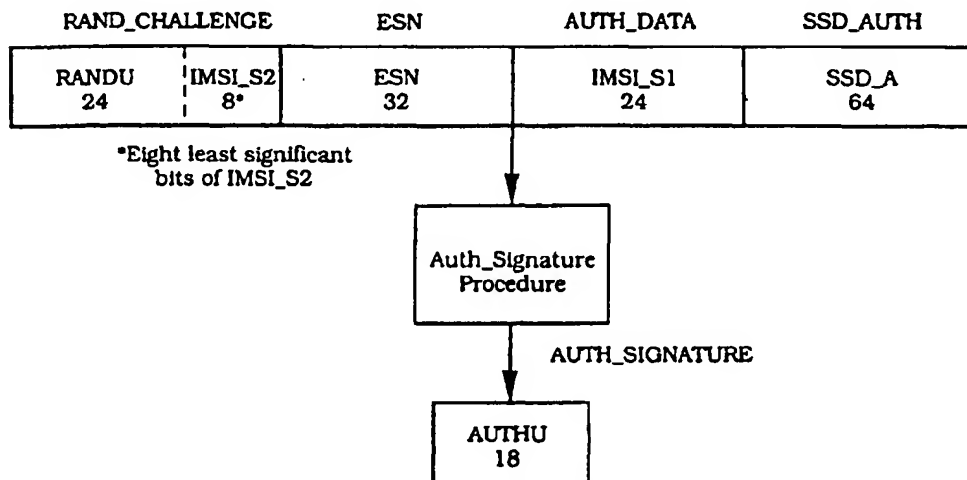


Figure 6.3.12.1.5-1. Computation of AUTHU for the Unique Challenge-Response Procedure

1 6.3.12.1.6 Authentication of Mobile Station Originations

2 When AUTH<sub>s</sub> is set to '01' (standard authentication mode), and the mobile station attempts  
3 to originate a call (by sending an *Origination Message* on the Access Channel), the following  
4 authentication procedures shall be performed:

5 The mobile station shall set the input parameters of the Auth\_Signature procedure (see  
6 "Interface Specification for Common Cryptographic Algorithms," section 2.3) as illustrated  
7 in Figure 6.3.12.1.6-1. The AUTH\_DATA input parameter shall contain the last six digits  
8 contained in the CHAR<sub>i</sub> fields of the *Origination Message*, encoded as follows: If a CHAR<sub>i</sub>  
9 field represents one of the digits 0-9, \* or #, the digit shall be encoded according to  
10 Table 6.7.1.3.2.4-4. If the CHAR<sub>i</sub> field represents any other character, the CHAR<sub>i</sub> field shall  
11 be converted to its decimal equivalent (treated as an unsigned binary number), and the  
12 digit shall be the least significant decimal digit of the decimal equivalent, encoded according  
13 to Table 6.7.1.3.2.4-4.

14 If fewer than six digits are included in the *Origination Message*, the most significant bits of  
15 IMSI\_S1 shall be used to replace the missing digits. The exact procedure is that IMSI\_S1 is  
16 used to initially fill the AUTH\_DATA input parameter and then the last dialed digits entered  
17 by the subscriber are used to replace all or part of this initial value. If a full 6 digits are  
18 dialed, the first digit of the 6 that was dialed is used as the most significant 4 bits of  
19 AUTH\_DATA, the second digit is the next less-significant 4 bits of AUTH\_DATA, and so  
20 forth. If less than 6 digits are dialed, then the least significant 4 bits of AUTH\_DATA are the  
21 last dialed digit, the second-last dialed digit becomes the next more-significant 4 bits of  
22 AUTH\_DATA, and so on up to the first of the dialed digits.

23 The mobile station shall set the SAVE\_REGISTERS input parameter to TRUE.

24 The mobile station shall then execute the Auth\_Signature Procedure. The 18-bit output  
25 AUTH\_SIGNATURE shall be used to fill the AUTHR field of the *Origination Message*. The  
26 RANDC (eight most significant bits of RAND) and COUNT fields of the message shall be  
27 filled with the current values stored in the mobile station.

28 The base station compares the received value of RANDC to the most significant eight bits of  
29 its internally stored value of RAND.

30 The base station may also compare the received value of COUNT with its internally stored  
31 value associated with the received IMSI/ESN.

32 The base station computes the value of AUTHR in the same manner as the mobile station,  
33 but using its internally stored value of SSD\_A. The base station compares its computed  
34 value of AUTHR to the value received from the mobile station.

35 If the comparisons executed at the base station are successful, the base station may initiate  
36 the appropriate channel assignment procedures. After channel assignment, the base  
37 station may issue a *Parameter Update Order* on the Forward Traffic Channel, updating the  
38 value of COUNT<sub>s-p</sub> in the mobile station.

39 If any of the comparisons fail, the base station may deny service, initiate the Unique  
40 Challenge-Response Procedure (see 6.3.12.1.5) or commence the process of updating SSD  
41 (see 6.3.12.1.9).

sequence shall replace the least significant four significant digit in the sequence shall replace AUTH\_DATA and so on until all of the sequence have been incorporated into the value of

STERS input parameter to FALSE.

h\_Signature Procedure. The 18-bit output is AUTHR field of the *Data Burst Message*. The (ID) and COUNT fields of the message shall be received from the mobile station.

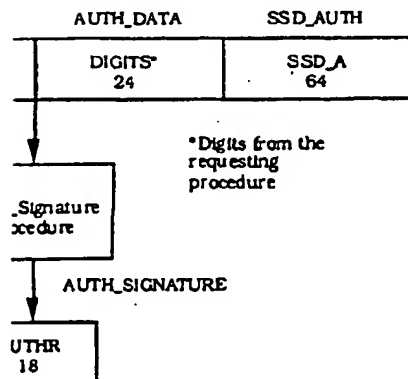
ie of RANDC to the most significant eight bits of

received value of COUNT with its internally stored value.

THR in the same manner as the mobile station, and by generating the AUTH\_DATA input in the mobile station. The base station compares its received from the mobile station.

station are successful, the base station may

ion may ignore the message, initiate the Unique ID (1.5) or commence the process of updating SSD



#### of AUTHR for Authentication of Mobile Data Bursts

(SSD)

on procedure (see "Interface Specification for Common C 2.2.1), initialized with mobile station specific information. The A-key is 64 bits long. It is

RAND_CHALLENGE	ESN
RAND 32	ESN 32

A

Figure 6.3.12.1.6-1. Computational Statistics

#### 6.3.12.1.7 Authentication of Mobile Station

When AUTH<sub>g</sub> is set to '01' (standard authentication), the base station shall initiate a page (by sending a *Page Response*) to a mobile station. The authentication procedures shall be performed as follows:

The mobile station shall set the input parameters to the "Interface Specification for Common C 2.2.1" as follows: In Figure 6.3.12.1.7-1.

The mobile station shall set the SAVE\_ID to 0.

The mobile station shall then execute the AUTH\_SIGNATURE procedure. The AUTH\_SIGNATURE shall be used to fill the RANDC (eight most significant bits filled with the current values stored in the mobile station).

The base station compares the received RANDC with its internally stored value of RAND.

The base station may also compare the received value associated with the received IMSI with its internally stored value of IMSI.

The base station computes the value of RANDC but using its internally stored value of RANDC. The value of AUTHR to the value received from the mobile station.

If the comparisons executed at the base station are successful, the base station shall initiate the appropriate channel assignment.

the Forward Traffic Channel, updating the

n may deny service, initiate the Unique  
r commence the process of updating SSD

AUTH_DATA	SSD_AUTH
IMSI_S1 24	SSD_A 64

ature  
re

AUTH\_SIGNATURE

THR for Authentication of Mobile  
ations

Bursts

on mode), and the mobile station attempts  
is Channel, the following authentication

ers of the Auth\_Signature procedure (see  
hic Algorithms," section 2.3) as illustrated

ng the AUTH\_DATA parameter with the 24  
of the pre-filled value with up to six 4-bit  
ding to BURST\_TYPE) requesting the Data

: AUTH\_DATA input as follows:

sequence of digits that is 0 to 6 digits in  
is a 4-bit binary value, encoded according

1 assigned to the mobile station and is stored in  
2 identification memory. The A-key is known only  
3 Home Location Register/Authentication Center  
4 "User Interface for Authentication Key Entry,"  
5 station.

6 The SSD update procedure is performed as follo

7 The base station sends an *SSD Update Mes*  
8 *Forward Traffic Channel*. The RANDSSD field  
9 same value used for the HLR/AC computation o

10 Upon receipt of the *SSD Update Message* the m  
11 of the SSD\_Generation procedure (see "Interfa  
12 Algorithms," section 2.2.1) as illustrated in Fig  
13 then execute the SSD\_Generation procedure. T  
14 SSD\_B\_NEW to the outputs of the SSD\_Generat

15 The mobile station shall then select a 32-bit ran  
16 the base station in a *Base Station Challenge Or*  
17 *Channel*.

18 Both the mobile station and the base station  
19 Auth\_Signature procedure (see "Interface S  
20 Algorithms," section 2.3) as illustrated in F  
21 Auth\_Signature procedure.

22 The mobile station and base station shall set  
23 FALSE.

24 The mobile station and base station shall execu  
25 is set to the 18-bit result AUTH\_SIGNATURE. 1  
26 AUTHBS to the mobile station in a *Base Station*  
27 *Channel* or the Forward Traffic Channel.

28 Upon receipt of the *Base Station Challenge* (  
29 compare the received value of AUTHBS to its  
30 station receives a *Base Station Challenge Conf*  
31 progress, the mobile station shall respond with

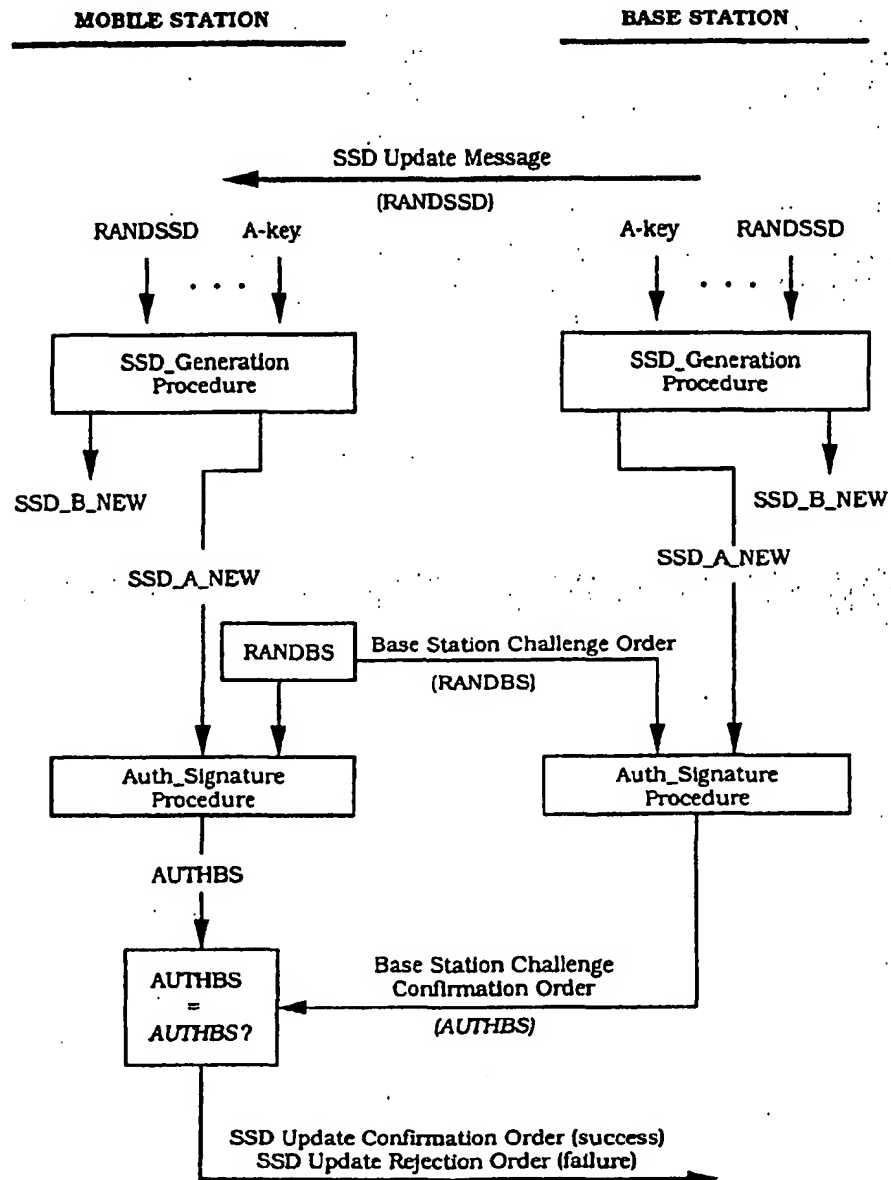
32 If the comparison is successful, the mobile stat  
33 (see "Interface Specification for Common Cryp  
34 SSD\_A and SSD\_B to SSD\_A\_NEW and SSD\_B\_  
35 then send an *SSD Update Confirmation Orde*  
36 completion of the SSD update.

37 If the comparison is not successful, the mot  
38 SSD\_B\_NEW. The mobile station shall then  
39 base station, indicating unsuccessful completi

40 Upon receipt of the *SSD Update Confirmatio*  
41 SSD\_B to the values received from the HLR/AC

- 1 If the mobile station fails to receive the *Base Station Challenge Confirmation Order* within  
 2  $T_{64m}$  seconds of when the acknowledgement to the *Base Station Challenge Order* was  
 3 received, the mobile station shall discard *SSD\_A\_NEW* and *SSD\_B\_NEW*. The mobile  
 4 station shall then terminate the SSD update process.

5



6

7

Figure 6.3.12.1.9-1. SSD Update Message Flow



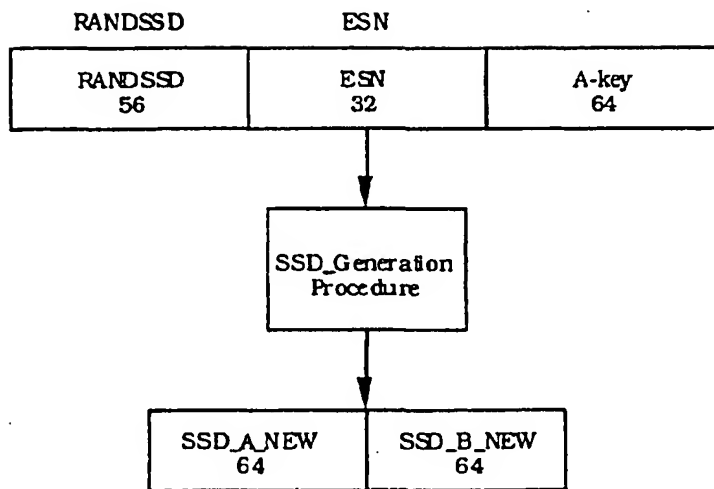


Figure 6.3.12.1.9-2. Computation of Shared Secret Data (SSD)

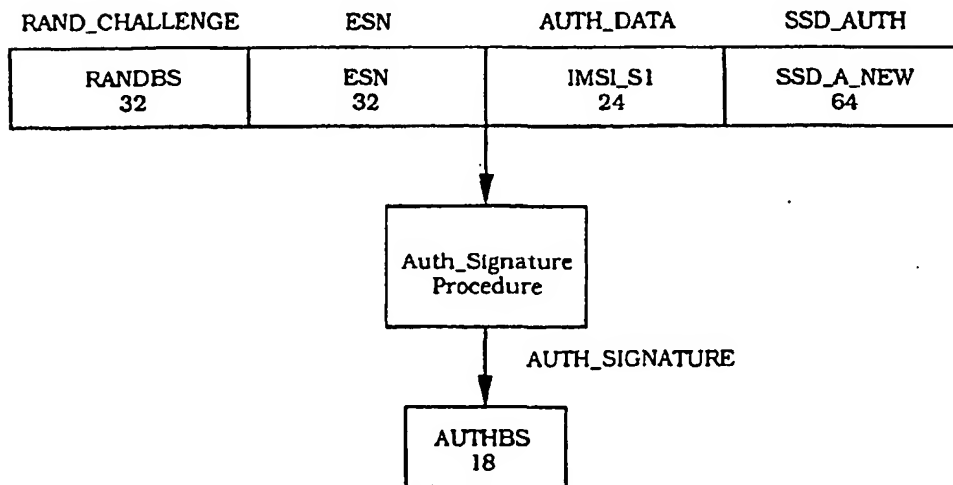


Figure 6.3.12.1.9-3. Computation of AUTHBS

### 6.3.12.2 Signaling Message Encryption

In an effort to enhance the authentication process and to protect sensitive subscriber information (such as PINs), a method is provided to encrypt certain fields of selected Traffic Channel signaling messages. See Appendix A for the list of messages and fields to be encrypted.

The message encryption algorithm is described in "Common Cryptographic Algorithms." The availability of encryption algorithm information is governed under the U. S. International Traffic and Arms Regulation (ITAR) and the Export Administration Regulations. TIA acts as the focal point and facilitator for making such information available.

Messages shall not be encrypted if authentication is not performed (AUTH<sub>s</sub> is set to '00'). See "Interface Specification for Common Cryptographic Algorithms" for details of the initialization and use of the encryption procedure.

Signaling message encryption is controlled for each call individually. The initial encryption mode for the call is established by the value of the ENCRYPT\_MODE field in the Channel Assignment Message. If ENCRYPT\_MODE is set to '00', message encryption is off. To turn encryption on after channel assignment, the base station sends one of the following Forward Traffic channel messages to the mobile station:

- Extended Handoff Direction Message with the ENCRYPT\_MODE field set to '01'
- Handoff Direction Message with the ENCRYPT\_MODE field set to '01'
- Analog Handoff Direction Message with the MEM field set to '1'
- Message Encryption Mode Order with the ENCRYPT\_MODE field set to '01'

To turn signaling message encryption off, the base station sends one of the following Forward Traffic Channel messages to the mobile station:

- Extended Handoff Direction Message with the ENCRYPT\_MODE field set to '00'
- Handoff Direction Message with the ENCRYPT\_MODE field set to '00'
- Analog Handoff Direction Message with the MEM field set to '0'
- Message Encryption Mode Order with the ENCRYPT\_MODE field set to '00'

Every Reverse Traffic Channel message contains an ENCRYPTION field which identifies the message encryption mode active at the time the message was created (see 6.7.2.3.1.2).

### 6.3.12.3 Voice Privacy

Voice privacy is provided in the CDMA system by means of the private long code mask used for PN spreading (see 6.1.3.1.8).

The generation and application of the private long code mask is specified in Appendix A.

Voice privacy is provided on the Traffic Channels only. All calls are initiated using the public long code mask for PN spreading (see 6.1.3.1.8). The mobile station user may request voice privacy during call setup using the Origination Message or Page Response

1 *Message*, and during Traffic Channel operation using the *Long Code Transition Request*  
 2 *Order*.

3 The transition to private long code mask shall not be performed if authentication is not  
 4 performed (AUTH<sub>s</sub> is set to '00' or mobile station unable to perform authentication).

5 To initiate a transition to the private or public long code mask, either the base station or  
 6 the mobile station sends a *Long Code Transition Request Order* on the Traffic Channel. The  
 7 mobile station actions in response to receipt of this order are specified in 6.6.4, and the  
 8 base station actions in response to receipt of this order are specified in 7.6.4.

9 The base station can also cause a transition to the private or public long code mask by  
 10 sending either the *Extended Handoff Direction Message* or the *Handoff Direction Message*  
 11 with the PRIVATE\_LCM bit set appropriately.

#### 12 6.3.13 Lock and Maintenance Required Orders

13 The mobile station shall have memory to store the lock reason code (LCKRSN<sub>P<sub>s</sub>-p</sub>) received  
 14 in the *Lock Until Power-Cycled Order*. The data retention time under power-off conditions  
 15 shall be at least 48 hours.

16 The mobile station shall have memory to store the maintenance reason code (MAINTRSN<sub>s-p</sub>)  
 17 received in the *Maintenance Required Order*. The data retention time under power-off  
 18 conditions shall be at least 48 hours.

19 There are no requirements on the use of the lock and maintenance reason codes, and  
 20 interpretation and use are implementation dependent.

#### 21 6.3.14 Mobile Station Revision Identification

22 The mobile station shall provide memory to store the following parameters sent in the  
 23 *Status Message* (*Terminal Information* information record):

- 24 • Protocol revision number (MOB\_P\_REV<sub>p</sub>)
- 25 • Manufacturer's model number (MOB\_MODEL<sub>p</sub>)
- 26 • Firmware revision number (MOB\_FIRM\_REV<sub>p</sub>)

### 27 6.4 Supervision

28 This section details the supervision mechanisms in CDMA. The time and numerical  
 29 constant values (e.g., T<sub>30m</sub> and N<sub>2m</sub>) are given in Appendix D.

#### 30 6.4.1 Pilot Channel

31 The mobile station shall monitor the Pilot Channel at all times except when not receiving in  
 32 the slotted mode. The mobile station shall measure the strength of the Pilot Channel as  
 33 specified in 6.6.6.2.2.

1   6.4.2 Sync Channel

2   The mobile station shall check the CRC of all received Sync Channel messages (see  
3   7.7.1.2.2). The mobile station shall consider any message with a CRC that checks to be  
4   valid. The mobile station shall ignore any message which is not valid.

5   6.4.3 Paging Channel

6   The mobile station shall check the CRC of all received Paging Channel messages (see  
7   7.7.2.2.2). The mobile station shall consider any message with a CRC that checks to be  
8   valid. The mobile station shall ignore any message which is not valid.

9   If the mobile station is operating in the *Mobile Station Idle State*, it shall monitor the Paging  
10   Channel as specified in 6.6.2.1.1. The mobile station shall set a timer for  $T_{30m}$  seconds  
11   whenever it begins to monitor the Paging Channel. The mobile station shall reset the timer  
12   for  $T_{30m}$  seconds whenever it receives a valid message on the Paging Channel, whether  
13   addressed to the mobile station or not. The mobile station shall disable the timer when it is  
14   not monitoring the Paging Channel. If the timer expires, the mobile station shall declare a  
15   loss of the Paging Channel.

16   When in the *System Access State*, the mobile station shall monitor the Paging Channel at  
17   all times. The mobile station shall reset a timer for  $T_{40m}$  seconds whenever a valid  
18   message is received on the Paging Channel, whether addressed to the mobile station or not.  
19   If the timer expires, the mobile station shall declare a loss of the Paging Channel.

20   6.4.4 Forward Traffic Channel

21   The mobile station shall check the CRC of all received Forward Traffic messages (see  
22   7.7.3.2.2). The mobile station shall consider any message with a CRC that checks to be  
23   valid. The mobile station shall ignore any message which is not valid.

24   When in the *Mobile Station Control on the Traffic Channel State*, the mobile station shall  
25   monitor the Forward Traffic Channel at all times. If the mobile station receives  $N_{2m}$   
26   consecutive bad frames on the Forward Traffic Channel (see 6.2.2.2), it shall disable its  
27   transmitter. Thereafter, if the mobile station receives  $N_{3m}$  consecutive good frames, the  
28   mobile station should re-enable its transmitter.

29   The mobile station shall establish a Forward Traffic Channel fade timer. The timer shall be  
30   enabled when the mobile station first enables its transmitter when in the *Traffic Channel  
31   Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*. The fade  
32   timer shall be reset for  $T_{5m}$  seconds whenever  $N_{3m}$  consecutive good frames are received on  
33   the Forward Traffic Channel. If the timer expires, the mobile station shall disable its  
34   transmitter and declare a loss of the Forward Traffic Channel. The mobile station also  
35   resets this timer when it re-enables its transmitter when performing a CDMA to CDMA hard  
handoff (see 6.6.6.2.8).

## 6.4.5 Accumulated Statistics

### 6.4.5.1 Accumulated Access Channel Statistics

The mobile station shall maintain the counters shown in Table 6.4.5.1-1. Each counter shall be 16 bits long. The mobile station shall initialize each counter described herein to zero upon power-on; the mobile station shall not re-initialize any counter described herein at any other time except upon command from the base station. Each counter shall be maintained modulo  $2^{16}$ .

The mobile station shall increment the ACC\_1 counter for each Access Channel request message it generates. The mobile station shall increment the ACC\_2 counter for each Access Channel response messages it generates. The mobile station shall increment the ACC\_i counter during the i minus one transmission of an access probe in the access attempt, for i equals three to seven. The mobile station shall increment ACC\_8 if the access attempt is unsuccessful due to the transmission of MAX\_REQ\_SEQ or MAX\_RSP\_SEQ probe sequences.

Table 6.4.5.1-1. Accumulated Access Channel Statistics

Counter Identifier	Length (bits)	Description
ACC_1	16	Number of Access Channel request messages generated by layer 3
ACC_2	16	Number of Access Channel response messages generated by layer 3
ACC_3	16	Number of times that an access probe was transmitted at least twice
ACC_4	16	Number of times that an access probe was transmitted at least three times
ACC_5	16	Number of times that an access probe was transmitted at least four times
ACC_6	16	Number of times that an access probe was transmitted at least five times
ACC_7	16	Number of times that an access probe was transmitted at least six times
ACC_8	16	Number of unsuccessful access attempts

#### 6.4.5.2 Accumulated Reverse Traffic Channel Statistics

The mobile station shall maintain the counters shown in Table 6.4.5.2-1 when supporting Multiplex Option 1. Each used counter shall be 24 bits long. The mobile station shall initialize each used counter described herein to zero upon power-on; the mobile station shall not re-initialize any counter described herein at any other time except upon command from the base station. Each used counter shall be maintained modulo  $2^{24}$ .

Each time a Multiplex Option 1 Reverse Traffic Channel frame is transmitted, the mobile station shall increment the counter corresponding to the type of frame.

**Table 6.4.5.2-1. Accumulated Reverse Traffic Channel Statistics**

Counter Identifier	Length (bits)	Type of Frame
MUX1_REV_1	24	9600 bps frame, primary traffic only
MUX1_REV_2	24	9600 bps frame, dim-and-burst with Rate 1/2 primary and signaling traffic
MUX1_REV_3	24	9600 bps frame, dim-and-burst with Rate 1/4 primary and signaling traffic
MUX1_REV_4	24	9600 bps frame, dim-and-burst with Rate 1/8 primary and signaling traffic
MUX1_REV_5	24	9600 bps frame, blank-and-burst with signaling traffic only
MUX1_REV_6	24	4800 bps frame, primary traffic only
MUX1_REV_7	24	2400 bps frame, primary traffic only
MUX1_REV_8	24	1200 bps frame, primary traffic or null Traffic Channel data only
MUX1_REV_9	0	Reserved
MUX1_REV_10	0	Reserved
MUX1_REV_11	24	9600 bps frame, dim-and-burst with Rate 1/2 primary and secondary traffic
MUX1_REV_12	24	9600 bps frame, dim-and-burst with Rate 1/4 primary and secondary traffic
MUX1_REV_13	24	9600 bps frame, dim-and-burst with Rate 1/8 primary and secondary traffic
MUX1_REV_14	24	9600 bps frame, blank-and-burst with secondary traffic only

### 6.4.5.3 Accumulated Paging Channel Statistics

The mobile station shall maintain the counters shown in Table 6.4.5.3-1. The counters shall have the length as specified in Table 6.4.5.3-1. The mobile station shall initialize each counter described herein to zero upon power-on; the mobile station shall not re-initialize any counter described herein at any other time except upon command from the base station. Each counter shall be maintained modulo  $2^{\text{Length}}$ , where Length is specified in Table 6.4.5.3-1.

The mobile station shall increment the counter PAG\_1 for each Paging Channel message CRC that it tests. The mobile station shall increment the counter PAG\_2 for each invalid Paging Channel message. The mobile station shall increment the counter PAG\_3 for each record or message that it receives addressed to the mobile station. The PAG\_3 counter shall not be incremented for messages detected as duplicates or for acknowledgements.<sup>11</sup> The mobile station shall increment the counter PAG\_4 for each Paging Channel half frame (see 7.7.2.1.2) that it receives. The mobile station shall increment the counter PAG\_5 for each Paging Channel half frame that contains any part of a valid message. The mobile station shall increment the counter PAG\_6 each time that it declares a loss of the Paging Channel (see 6.4.3). The mobile station shall increment the counter PAG\_7 for each idle handoff it performs.

**Table 6.4.5.3-1. Accumulated Paging Channel Statistics**

Counter Identifier	Length (bits)	Description
PAG_1	24	Number of Paging Channel messages the mobile station attempted to receive
PAG_2	24	Number of Paging Channel messages the mobile station received that CRC does not check
PAG_3	16	Number of Paging Channel messages or records the mobile station received that were addressed to it
PAG_4	24	Number of Paging Channel half frames received by the mobile station
PAG_5	24	Number of Paging Channel half frames that contain any part of a message with a CRC that checks
PAG_6	16	Number of times that the mobile station declared a loss of the Paging Channel
PAG_7	16	Number of mobile station idle handoffs

<sup>11</sup>PAG\_3 counts those messages processed by layer 3.

#### 6.4.5.4 Accumulated Forward Traffic Channel Statistics

The mobile station shall maintain the counters shown in Table 6.4.5.4-1 when supporting Multiplex Option 1. Each counter shall be 24 bits long. The mobile station shall initialize each counter described herein to zero upon power-on; the mobile station shall not re-initialize any counter described herein at any other time except upon command from the base station. Each counter shall be maintained modulo  $2^{24}$ .

Each time a mobile station categorizes a received Multiplex Option 1 Forward Traffic Channel frame (see 6.2.2.2), the mobile station shall increment the counter corresponding to the type of frame. The accumulation shall start when the mobile station enables its transmitter while in the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State* (see 6.6.4.2). The accumulation shall stop when the mobile station exits the *Mobile Station Control on the Traffic Channel State*.

Table 6.4.5.4-1. Accumulated Forward Traffic Channel Statistics

Counter Identifier	Length (bits)	Type of Frame
MUX1_FOR_1	24	9600 bps frame, primary traffic only
MUX1_FOR_2	24	9600 bps frame, dim-and-burst with Rate 1/2 primary and signaling traffic
MUX1_FOR_3	24	9600 bps frame, dim-and-burst with Rate 1/4 primary and signaling traffic
MUX1_FOR_4	24	9600 bps frame, dim-and-burst with Rate 1/8 primary and signaling traffic
MUX1_FOR_5	24	9600 bps frame, blank-and-burst with signaling traffic only
MUX1_FOR_6	24	4800 bps frame, primary traffic only
MUX1_FOR_7	24	2400 bps frame, primary traffic only
MUX1_FOR_8	24	1200 bps frame, primary traffic or null Traffic Channel data only
MUX1_FOR_9	24	9600 bps frame with bit errors
MUX1_FOR_10	24	Frame quality insufficient to decide upon rate
MUX1_FOR_11	24	9600 bps frame, dim-and-burst with Rate 1/2 primary and secondary traffic
MUX1_FOR_12	24	9600 bps frame, dim-and-burst with Rate 1/4 primary and secondary traffic
MUX1_FOR_13	24	9600 bps frame, dim-and-burst with Rate 1/8 primary and secondary traffic
MUX1_FOR_14	24	9600 bps frame, blank-and-burst with secondary traffic only



#### 6.4.5.5 Accumulated Layer Two Statistics

The mobile station shall maintain the counters shown in Table 6.4.5.5-1. Each counter shall be 16 bits long. The mobile station shall initialize each counter described herein to zero upon power-on; the mobile station shall not re-initialize any counter described herein at any other time except upon command from the base station. Each counter shall be maintained modulo  $2^{16}$ .

When the mobile station transmits a Reverse Traffic Channel message requiring an acknowledgement for the  $i$ th time, for  $i$  equals one to three it shall increment the counter LAYER2\_RTC1.

The mobile station shall increment the counter LAYER2\_RTC4 each time it aborts using the Traffic Channel because the timeout expired after the  $N_{1m}$  transmission of a message requiring an acknowledgement.

The mobile station shall increment the counter LAYER2\_RTC5 for each transmission of a message not requiring an acknowledgement on the Reverse Traffic Channel. This count shall include all transmissions, including those that were repeated multiple times or those carrying an identical layer 3 content.

Table 6.4.5.5-1. Accumulated Layer 2 Statistics

Counter Identifier	Length (bits)	Description
LAYER2_RTC1	16	Number of messages requiring acknowledgement that were transmitted at least once on the Reverse Traffic Channel
LAYER2_RTC2	16	Number of messages requiring acknowledgement that were transmitted at least twice on the Reverse Traffic Channel
LAYER2_RTC3	16	Number of messages requiring acknowledgement that were transmitted at least three times on the Reverse Traffic Channel
LAYER2_RTC4	16	Number of times that the mobile station aborted a call as a result of the timeout expiring after the $N_{1m}$ transmission of a message requiring acknowledgement
LAYER2_RTC5	16	Number of times a message not requiring an acknowledgement was sent on the Reverse Traffic Channel

#### 6.4.5.6 Other Monitored Quantities and Statistics

The mobile station shall store the value described in Table 6.4.5.6-1.

**Table 6.4.5.6-1. Other Monitored Quantities and Statistics**

Quantity Identifier	Length (bits)	Description
OTHER_SYS_TIME	36	The SYS_TIME field from the most recently received <i>Sync Channel Message</i>

### 6.5 Malfunction Detection

To ensure that a mobile station transmits a spread spectrum signal which does not adversely affect system capacity, the mobile station shall respond to the *Lock Until Power-Cycled Order* and *Maintenance Required Order* from the base station as specified in 6.6.2.4, 6.6.3.2 through 6.6.3.7, and 6.6.4.3 through 6.6.4.5. It is the responsibility of the base station to detect a mobile station transmission malfunction and to send the appropriate message.

#### 6.5.1 Malfunction Timer

The mobile station shall have a malfunction timer which meets the requirements of 2.5.1.

### 6.6 Call Processing

This section describes mobile station call processing. It contains frequent references to the messages that flow between the mobile station and base station. While reading this section, it may be helpful to refer to the message formats (see 6.7 and 7.7), and to the message flow examples (see Appendix B).

The mobile station shall ignore fields at the end of messages which do not exist in the protocol revision supported by the mobile station.

The values for the time and numerical constants used in this section (e.g.,  $T_{20m}$ ,  $N_{4m}$ ) are specified in Appendix D.

As illustrated in Figure 6.6-1, mobile station call processing consists of the following states:

- *Mobile Station Initialization State* - In this state, the mobile station selects and acquires a system.
- *Mobile Station Idle State* - In this state, the mobile station monitors messages on the Paging Channel.
- *System Access State* - In this state, the mobile station sends messages to the base station on the Access Channel.
- *Mobile Station Control on the Traffic Channel State* - In this state, the mobile station communicates with the base station using the Forward and Reverse Traffic Channels.

After power is applied to the mobile station, it shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a power-up indication (see 6.6.1.1).

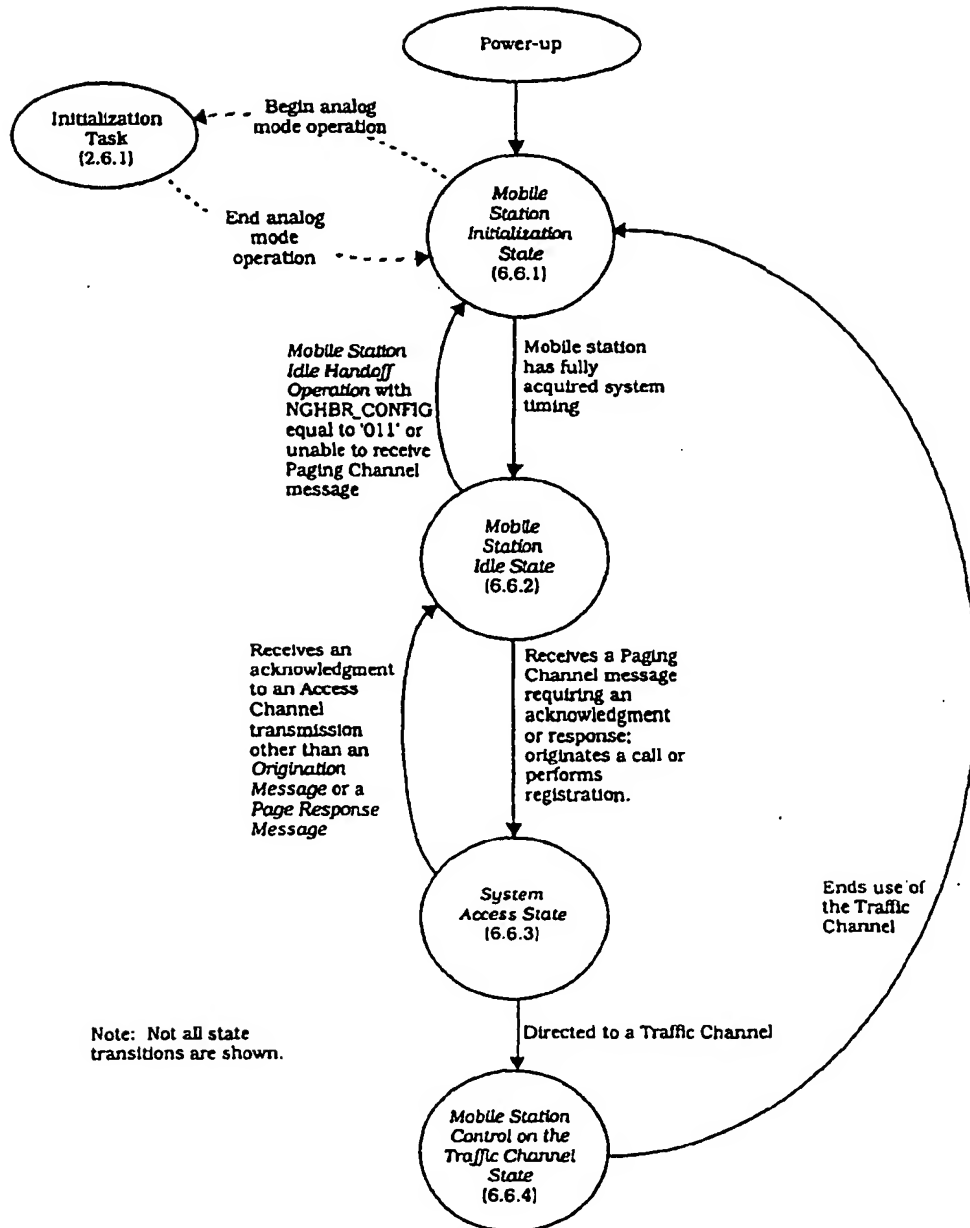


Figure 6.6-1. Mobile Station Call Processing States

1   **6.6.1 Mobile Station Initialization State**

2   In this state, the mobile station first selects a system to use. If the selected system is a  
3   CDMA system, the mobile station proceeds to acquire and then synchronize to the CDMA  
4   system. If the selected system is an analog system, the mobile station begins analog mode  
5   operation (see 2.6.1).

6   As illustrated in Figure 6.6.1-1, the *Mobile Station Initialization State* consists of the  
7   following substates:

- 8       • *System Determination Substate* - In this substate, the mobile station selects which  
9       system to use.
- 10      • *Pilot Channel Acquisition Substate* - In this substate, the mobile station acquires the  
11      Pilot Channel of a CDMA system.
- 12      • *Sync Channel Acquisition Substate* - In this substate, the mobile station obtains  
13      system configuration and timing information for a CDMA system.
- 14      • *Timing Change Substate* - In this substate, the mobile station synchronizes its timing  
15      to that of a CDMA system.

16   While in the *Mobile Station Initialization State*, the mobile station shall update all active  
17   registration timers as specified in 6.6.5.1.2.

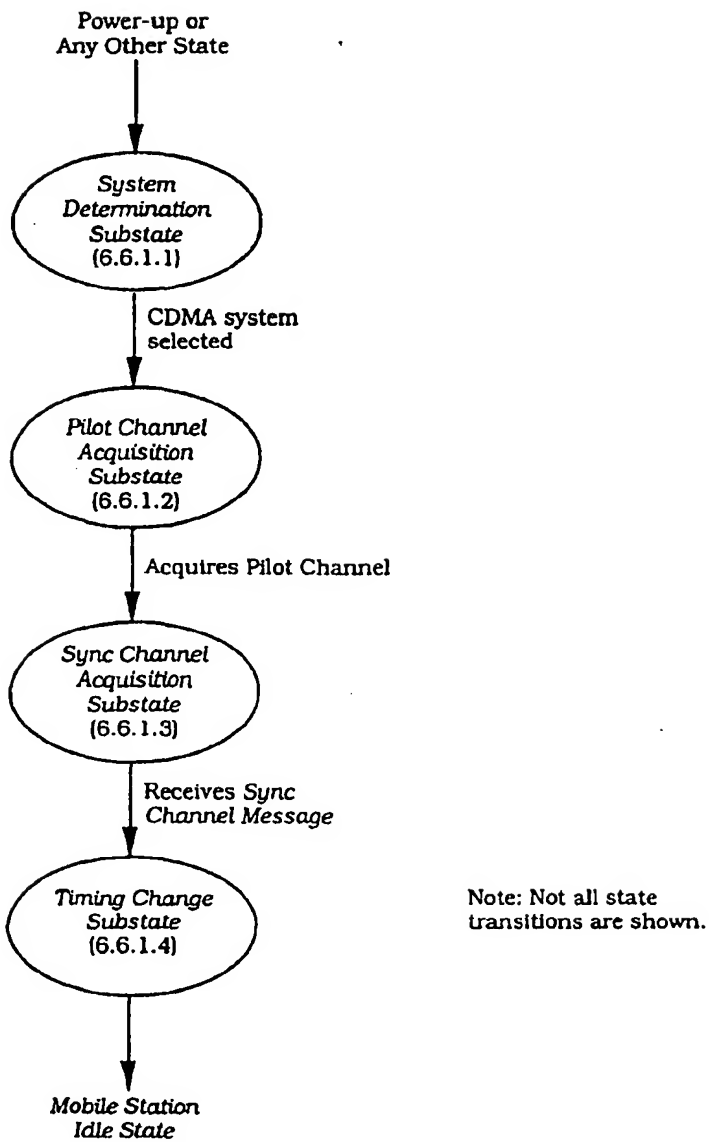


Figure 6.6.1-1. Mobile Station Initialization State

1    6.6.1.1 System Determination Substate

2    In this substate, the mobile station selects the system to use.

3    Upon entering the *System Determination Substate*, the mobile station shall initialize  
4    registration parameters as specified in 6.6.5.5.1.1.

5    If the mobile station enters the *System Determination Substate* with a power-up indication,  
6    the mobile station shall set the First-Idle ID status to enabled (see 2.6.3.1.1), the RAND<sub>s</sub>  
7    variable to 0 (see 2.3.12.1.2), and the REDIRECTION<sub>s</sub> variable to disabled. The mobile  
8    station shall select a system in accordance with the custom system selection process (see  
9    6.6.1.1.1), and shall attempt to acquire the selected system (see 6.6.1.1.3).

10   If the mobile station enters the *System Determination Substate* with an acquisition failure  
11   indication, the mobile station shall perform the following:

- 12   • If REDIRECTION<sub>s</sub> is equal to enabled, the mobile station shall attempt to select  
13   another system in accordance with the current redirection criteria (see 6.6.1.1.2). If  
14   the mobile station is able to select another system, the mobile station shall attempt  
15   to acquire the selected system (see 6.6.1.1.3). Otherwise, if the mobile station has  
16   exhausted all possible selections using the current redirection criteria, the mobile  
17   station shall perform the following:
  - 18   - The mobile station shall set REDIRECTION<sub>s</sub> to disabled.
  - 19   - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '1', the mobile station shall attempt to select the  
20   system from which it was redirected, and shall attempt to acquire the selected  
21   system (see 6.6.1.1.3). The precise process for determining how to select the  
22   system from which the mobile station was redirected is left to the mobile station  
23   manufacturer.
  - 24   - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '0', the mobile station shall select a system in  
25   accordance with the custom system selection process (see 6.6.1.1.1), and shall  
26   attempt to acquire the selected system (see 6.6.1.1.3).
- 27   • If REDIRECTION<sub>s</sub> is equal to disabled, the mobile station shall select a system in  
28   accordance with the custom system selection process (see 6.6.1.1.1), and shall  
29   attempt to acquire the selected system (see 6.6.1.1.3).

30   If the mobile station enters the *System Determination Substate* with a new system  
31   indication, the mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station  
32   shall select a system in accordance with the custom system selection process (see  
33   6.6.1.1.1), and shall attempt to acquire the selected system (see 6.6.1.1.3).

34   If the mobile station enters the *System Determination Substate* with a CDMA available  
35   indication, the mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station  
36   should set CDMACH<sub>s</sub> to the CDMA Channel (CDMA\_FREQ) specified in the *CDMA*  
37   *Capability Global Action Message* and should attempt to acquire a CDMA system on the  
38   specified CDMA channel (see 6.6.1.1.3). If the mobile station does not attempt to acquire a  
39   CDMA system on the specified CDMA Channel, the mobile station shall select a system in

- 1 accordance with the custom system selection process (see 6.6.1.1.1), and shall attempt to  
2 acquire the selected system (see 6.6.1.1.3).
- 3 If the mobile station enters the *System Determination Substate* with a reselection indication,  
4 the mobile station shall set REDIRECTION<sub>s</sub> to disabled and shall select a system in  
5 accordance with the custom system selection process (see 6.6.1.1.1), and shall attempt to  
6 acquire the selected system (see 6.6.1.1.3).
- 7 If the mobile station enters the *System Determination Substate* with a rescan indication, the  
8 mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station shall select a  
9 system in accordance with the custom system selection process (see 6.6.1.1.1), and shall  
10 attempt to acquire the selected system (see 6.6.1.1.3).
- 11 If the mobile station enters the *System Determination Substate* with a protocol mismatch  
12 indication, the mobile station shall perform the following:
- 13 • If REDIRECTION<sub>s</sub> is equal to enabled, the mobile station shall attempt to select  
14 another system in accordance with the current redirection criteria (see 6.6.1.1.2). If  
15 the mobile station is able to select another system, the mobile station shall attempt  
16 to acquire the selected system (see 6.6.1.1.3). Otherwise, if the mobile station has  
17 exhausted all possible selections using the current redirection criteria, the mobile  
18 station shall perform the following:
    - 19 - The mobile station shall set REDIRECTION<sub>s</sub> to disabled.
    - 20 - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '1', the mobile station shall attempt to select the  
21 system from which it was redirected, and shall attempt to acquire the selected  
22 system (see 6.6.1.1.3). The precise process for determining how to select the  
23 system from which the mobile station was redirected is left to the mobile station  
24 manufacturer.
    - 25 - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '0', the mobile station shall select a system in  
26 accordance with the custom system selection process (see 6.6.1.1.1), and shall  
27 attempt to acquire the selected system (see 6.6.1.1.3).
  - 28 • If REDIRECTION<sub>s</sub> is equal to disabled, the mobile station shall select a system in  
29 accordance with the custom system selection process (see 6.6.1.1.1), and shall  
30 attempt to acquire the selected system (see 6.6.1.1.3).
- 31 If the mobile station enters the *System Determination Substate* with a system lost  
32 indication, the mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station  
33 should attempt to select the same system that was lost, and should attempt to acquire the  
34 selected system (see 6.6.1.1.3). The precise process for determining how to select the same  
35 system is left to the mobile station manufacturer. If the mobile station does not attempt to  
36 select the same system, the mobile station shall select a system in accordance with the  
37 custom system selection process (see 6.6.1.1.1), and shall attempt to acquire the selected  
38 system (see 6.6.1.1.3).
- 39 If the mobile station enters the *System Determination Substate* with a lock indication, the  
40 mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station shall select a  
41 system in accordance with the custom system selection process (see 6.6.1.1.1), and shall  
42 attempt to acquire the selected system (see 6.6.1.1.3).

- 1 If the mobile station enters the *System Determination Substate* with an unlock indication,  
2 the mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station shall select a  
3 system in accordance with the custom system selection process (see 6.6.1.1.1), and shall  
4 attempt to acquire the selected system (see 6.6.1.1.3).
- 5 If the mobile station enters the *System Determination Substate* with an access denied  
6 indication, the mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station  
7 shall select a system in accordance with the custom system selection process (see  
8 6.6.1.1.1), and shall attempt to acquire the selected system (see 6.6.1.1.3).
- 9 If the mobile station enters the *System Determination Substate* with a release indication and  
10 REDIRECTION<sub>s</sub> is equal to enabled, the mobile station shall attempt to select the same  
11 system on which the release occurred, and shall attempt to acquire the selected system (see  
12 6.6.1.1.3). The precise process for determining how to select the same system is left to the  
13 mobile station manufacturer. If REDIRECTION<sub>s</sub> is equal to disabled, the mobile station  
14 shall select a system in accordance with the custom system selection process (see  
15 6.6.1.1.1), and shall attempt to acquire the selected system (see 6.6.1.1.3).
- 16 If the mobile station enters the *System Determination Substate* with an error indication, the  
17 mobile station shall set REDIRECTION<sub>s</sub> to disabled. The mobile station shall select a  
18 system in accordance with the custom system selection process (see 6.6.1.1.1), and shall  
19 attempt to acquire the selected system (see 6.6.1.1.3).
- 20 If the mobile station enters the *System Determination Substate* with a redirection indication,  
21 the mobile station shall set REDIRECTION<sub>s</sub> to enabled. The mobile station shall delete all  
22 entries from the ZONE\_LIST<sub>s</sub> and SID\_NID\_LIST<sub>s</sub>. The mobile station shall select a system  
23 in accordance with the current redirection criteria (see 6.6.1.1.2), and shall attempt to  
24 acquire the selected system (see 6.6.1.1.3).
- 25 If the mobile station enters the *System Determination Substate* with a registration rejected  
26 indication, the mobile station shall perform the following:
- 27     • If REDIRECTION<sub>s</sub> is equal to enabled, the mobile station shall perform the following:
- 28         - The mobile station shall set REDIRECTION<sub>s</sub> to disabled.
- 29         - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '1', the mobile station shall attempt to select the  
30             system from which it was redirected, and shall attempt to acquire the selected  
31             system (see 6.6.1.1.3). The precise process for determining how to select the  
32             system from which the mobile station was redirected is left to the mobile station  
33             manufacturer.
- 34         - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '0', the mobile station shall select the system in  
35             accordance with the custom system selected process (see 6.6.1.1.1), and shall  
36             attempt to acquire the selected system (see 6.6.1.1.3).
- 37     • If REDIRECTION<sub>s</sub> is equal to disabled, the mobile station shall select a system in  
38             accordance with the custom system selection process (see 6.6.1.1.1), and shall  
39             attempt to acquire the selected system (see 6.6.1.1.3).
- 40 If the mobile station enters the *System Determination Substate* with a wrong system  
41 indication, the mobile station shall perform the following:



- 1       • If REDIRECTION<sub>s</sub> is equal to enabled, the mobile station shall attempt to select  
2       another system in accordance with the current redirection criteria (see 6.6.1.1.2). If  
3       the mobile station is able to select another system, the mobile station shall attempt  
4       to acquire the selected system (see 6.6.1.1.3). Otherwise, if the mobile station has  
5       exhausted all possible selections using the current redirection criteria, the mobile  
6       station shall perform the following:
  - 7       - The mobile station shall set REDIRECTION<sub>s</sub> to disabled.
  - 8       - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '1', the mobile station shall attempt to select the  
9       system from which it was redirected, and shall attempt to acquire the selected  
10      system (see 6.6.1.1.3). The precise process for determining how to select the  
11      system from which the mobile station was redirected is left to the mobile station  
12      manufacturer.
  - 13      - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '0', the mobile station shall select a system in  
14      accordance with the custom system selection process (see 6.6.1.1.1), and shall  
15      attempt to acquire the selected system (see 6.6.1.1.3).
- 16      • If REDIRECTION<sub>s</sub> is equal to disabled, the mobile station shall select a system in  
17      accordance with the custom system selection process (see 6.6.1.1.1), and shall  
18      attempt to acquire the selected system (see 6.6.1.1.3).

19   If the mobile station enters the *System Determination Substate* with a wrong network  
20   indication, the mobile station shall perform the following:

- 21      • If REDIRECTION<sub>s</sub> is equal to enabled, the mobile station shall attempt to select  
22      another system in accordance with the current redirection criteria (see 6.6.1.1.2). If  
23      the mobile station is able to select another system, the mobile station shall attempt  
24      to acquire the selected system (see 6.6.1.1.3). Otherwise, if the mobile station has  
25      exhausted all possible selections using the current redirection criteria, the mobile  
26      station shall perform the following:
  - 27      - The mobile station shall set REDIRECTION<sub>s</sub> to disabled.
  - 28      - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '1', the mobile station shall attempt to select the  
29      system from which it was redirected, and shall attempt to acquire the selected  
30      system (see 6.6.1.1.3). The precise process for determining how to select the  
31      system from which the mobile station was redirected is left to the mobile station  
32      manufacturer.
  - 33      - If RETURN\_IF\_FAIL<sub>s</sub> is equal to '0', the mobile station shall select a system in  
34      accordance with the custom system selection process (see 6.6.1.1.1), and shall  
35      attempt to acquire the selected system (see 6.6.1.1.3).
- 36      • If REDIRECTION<sub>s</sub> is equal to disabled, the mobile station shall select a system in  
37      accordance with the custom system selection process (see 6.6.1.1.1), and shall  
38      attempt to acquire the selected system (see 6.6.1.1.3).

1    6.6.1.1.1 Custom System Selection Process

2    The precise process for custom system selection is left to the mobile station manufacturer.  
3    It is typically influenced by a set of expressed user preferences, such as the following:

- 4        • System A (or B) only
- 5        • System A (or B) preferred
- 6        • CDMA (or analog) system only
- 7        • CDMA (or analog) system preferred

8    The mobile station shall perform the custom system selection process as follows:

- 9        • The mobile station shall determine which system to use.
- 10       • If the mobile station is to use System A, it shall set  $SERVSYS_g$  to  $SYS\_A$ . If the  
11       mobile station is to use System B, it shall set  $SERVSYS_g$  to  $SYS\_B$ .
- 12       • If the mobile station is to use a CDMA system, it shall set  $CDMACH_g$  either to the  
13       Primary or Secondary CDMA Channel number (see 7.1.1.1) for the selected serving  
14       system ( $SERVSYS_g$ ). If the mobile station fails to acquire a CDMA system on the first  
15       CDMA Channel it tries, the mobile station should attempt to acquire on the alternate  
16       CDMA Channel (Primary or Secondary) before attempting other alternatives.

17   6.6.1.1.2 System Selection Using Current Redirection Criteria

18   To perform system selection using current redirection criteria, the mobile station shall use  
19   information received either in a *Service Redirection Message* or a *Global Service Redirection*  
20   *Message* and stored in the variable  $REDIRECT\_REC_g$ .

21   If the  $RECORD\_TYPE$  field of  $REDIRECT\_REC_g$  is equal to '00000001', the mobile station  
22   shall perform system selection as follows:

- 23       • If the  $SYS\_ORDERING$  field is equal to '000', the mobile station shall make sequential  
24       system selections as follows:
  - 25           - The mobile station shall set  $SERVSYS_g$  either to  $SYS\_A$  or  $SYS\_B$ . The precise  
26           process for determining how many system selections to make and for  
27           determining whether to use  $SYS\_A$  or  $SYS\_B$  is left to the mobile station  
28           manufacturer.
- 29       • If the  $SYS\_ORDERING$  field is equal to '001', the mobile station shall make at most  
30       one system selection as follows:
  - 31           - The mobile station shall set  $SERVSYS_g$  to  $SYS\_A$ .
- 32       • If the  $SYS\_ORDERING$  field is equal to '010', the mobile station shall make at most  
33       one system selection as follows:
  - 34           - The mobile station shall set  $SERVSYS_g$  to  $SYS\_B$ .
- 35       • If the  $SYS\_ORDERING$  field is equal to '011', the mobile station shall make at most 2  
36       sequential system selections as follows:
  - 37           - For the first system selection, the mobile station shall set  $SERVSYS_g$  to  $SYS\_A$ .

- 1       - For the second system selection, the mobile station shall set  $SERV_{SYS}_s$  to
- 2       **SYS\_B.**
- 3       • If the  $SYS\_ORDERING$  field is equal to '100', the mobile station shall make at most 2
- 4       sequential system selections as follows:
- 5       - For the first system selection, the mobile station shall set  $SERV_{SYS}_s$  to **SYS\_B.**
- 6       - For the second system selection, the mobile station shall set  $SERV_{SYS}_s$  to
- 7       **SYS\_A.**
- 8       • If the  $SYS\_ORDERING$  field is equal to '101', the mobile station shall make at most 2
- 9       sequential system selections as follows:
- 10      - For the first system selection, the mobile station shall set  $SERV_{SYS}_s$  either to
- 11      **SYS\_A** or **SYS\_B.** The precise process for determining whether to use **SYS\_A** or
- 12      **SYS\_B** first is left to the mobile station manufacturer.
- 13      - For the second system selection, the mobile station shall set  $SERV_{SYS}_s$  to
- 14      **SYS\_B** if **SYS\_A** was used for the first selection, or to **SYS\_A** if **SYS\_B** was used
- 15      for the first selection.
- 16      If the  $RECORD\_TYPE$  field of  $REDIRECT\_REC_s$  is equal to '00000010', the mobile station
- 17      shall perform system selection as follows:
- 18      • If the  $BAND\_CLASS$  field is equal to '00000', the mobile station shall make at most  $n$
- 19      sequential system selections, where  $n$  is equal to the value of the  $NUM\_CHANS$  field,
- 20      as follows:
- 21      - For the  $i^{th}$  system selection, where  $i$  ranges from 1 to  $n$ , the mobile station shall
- 22      set  $CDMACH_s$  to the value of the  $i^{th}$  occurrence of the  $CDMA\_CHAN$  field.

#### 23   6.6.1.1.3 Acquiring the Selected System

24   The mobile station shall attempt to acquire the selected system as follows:

- 25      • If the selected system is an analog system, the mobile station shall enter the
- 26      Initialization Task (see 2.6.1).
- 27      • If the selected system is a CDMA system, the mobile station shall enter the *Pilot*
- 28      *Channel Acquisition Substate.*

#### 29   6.6.1.2 Pilot Channel Acquisition Substate

30   In this substate, the mobile station acquires the Pilot Channel of the selected CDMA

31   system.

32   Upon entering the *Pilot Channel Acquisition Substate*, the mobile station shall tune to the

33   CDMA Channel number equal to  $CDMACH_s$ , shall set its code channel for the Pilot Channel

34   (see 7.1.3.1.8), and shall search for the Pilot Channel. If the mobile station acquires the

35   Pilot Channel within  $T_{20m}$  seconds (see Appendix D), the mobile station shall enter the

36   *Sync Channel Acquisition Substate.*

1 If the mobile station does not acquire the Pilot Channel within  $T_{20m}$  seconds, the mobile  
 2 station shall enter the *System Determination Substate* with an acquisition failure indication  
 3 (see 6.6.1.1).

#### 4 6.6.1.3 Sync Channel Acquisition Substate

5 In this substate, the mobile station receives and processes the *Sync Channel Message* to  
 6 obtain system configuration and timing information.

7 Upon entering the *Sync Channel Acquisition Substate*, the mobile station shall set its code  
 8 channel for the Sync Channel (see 7.1.3.1.8).

9 If the mobile station does not receive a valid *Sync Channel Message* (see 6.4.2) within  $T_{21m}$   
 10 seconds, the mobile station shall enter the *System Determination Substate*.

11 If the mobile station receives a valid *Sync Channel Message* within  $T_{21m}$  seconds but the  
 12 protocol revision level supported by mobile station ( $MOB\_P\_REV_p$ ) is less than the  
 13 minimum protocol revision level supported by the base station ( $MIN\_P\_REV_r$ ), the mobile  
 14 station shall enter the *System Determination Substate* with a protocol mismatch indication  
 15 (see 6.6.1.1).

16 If the mobile station receives a valid *Sync Channel Message* within  $T_{21m}$  seconds but the  
 17 value of the  $PRAT_r$  field is designated as reserved by the protocol revision level supported by  
 18 the mobile station ( $MOB\_P\_REV_p$ ), the mobile station shall enter the *System Determination*  
 19 *Substate* with a protocol mismatch indication (see 6.6.1.1).

20 If the mobile station receives a valid *Sync Channel Message* within  $T_{21m}$  seconds and the  
 21 protocol revision level supported by the mobile station ( $MOB\_P\_REV_p$ ) is greater than or  
 22 equal to the minimum protocol revision level supported by the base station ( $MIN\_P\_REV_r$ ),  
 23 the mobile station shall store the following information from the message:

- 24 • Protocol revision level ( $P\_REV_s = P\_REV_r$ )
- 25 • Minimum protocol revision level ( $MIN\_P\_REV_s = MIN\_P\_REV_r$ )
- 26 • System Identification ( $SID_s = SID_r$ )
- 27 • Network Identification ( $NID_s = NID_r$ )
- 28 • Pilot PN sequence offset ( $PILOT\_PN_s = PILOT\_PN_r$ )
- 29 • Long code state ( $LC\_STATE_s = LC\_STATE_r$ )
- 30 • System Time ( $SYS\_TIME_s = SYS\_TIME_r$ )
- 31 • Paging Channel data rate ( $PRAT_s = PRAT_r$ )

32 The mobile station shall ignore any fields at the end of the *Sync Channel Message* which are  
 33 not defined according to the protocol revision level ( $MOB\_P\_REV_p$ ) being used by the mobile  
 34 station.

35 The mobile station may store the following information from the message:

- 36 • Number of leap seconds that have occurred since the start of System Time  
 37 ( $LP\_SEC_s = LP\_SEC_r$ )
- 38 • Offset of local time from System Time ( $LTM\_OFF_s = LTM\_OFF_r$ )

- 1 • Daylight savings time indicator ( $DAYLT_s = DAYLT_r$ )
- 2 If REDIRECTION<sub>s</sub> is equal to disabled, the mobile station may enter the *System*
- 3 *Determination Substate* with a reselection indication (see 6.6.1.1).
- 4 If REDIRECTION<sub>s</sub> is equal to enabled, the EXPECTED\_SID field of REDIRECT\_REC<sub>s</sub> is not
- 5 equal to 0, and SID<sub>r</sub> is not equal to EXPECTED\_SID, the mobile station shall enter the
- 6 *System Determination Substate* with a wrong system indication (see 6.6.1.1). If
- 7 REDIRECTION<sub>s</sub> is equal to enabled, the EXPECTED\_NID field of REDIRECT\_REC<sub>s</sub> is not
- 8 equal to 65535, and NID<sub>r</sub> is not equal to EXPECTED\_NID, the mobile station shall enter the
- 9 *System Determination Substate* with a wrong network indication. Otherwise, the mobile
- 10 station shall enter the *Timing Change Substate*.

#### 11 6.6.1.4 Timing Change Substate

12 Figure 6.6.1.4-1 illustrates the mobile station timing changes that occur in this substate.  
 13 The mobile station synchronizes its long code timing and system timing to those of the  
 14 CDMA system, using the PILOT\_PN<sub>s</sub>, LC\_STATE<sub>s</sub>, and SYS\_TIME<sub>s</sub> values obtained from the  
 15 received *Sync Channel Message*. SYS\_TIME<sub>s</sub> is equal to the System Time (see 1.2)  
 16 corresponding to 320 ms past the end of the last 80 ms superframe (see Figure 7.1.3.2.1-1)  
 17 of the received *Sync Channel Message* minus the pilot PN sequence offset. LC\_STATE<sub>s</sub> is  
 18 equal to the system long code state (see 6.1.3.1.8) corresponding to SYS\_TIME<sub>s</sub>.

19 In the *Timing Change Substate*, the mobile station shall synchronize its long code timing to  
 20 the CDMA system long code timing derived from LC\_STATE<sub>s</sub>, and synchronize its system  
 21 timing to the CDMA system timing derived from SYS\_TIME<sub>s</sub>.

22 The mobile station shall:

- 23 • Set PAGECH<sub>s</sub> to the Primary Paging Channel (see 7.1.3.4);
- 24 • Set PAGE\_CHAN<sub>s</sub> to '1';
- 25 • Set the stored message sequence numbers CONFIG\_MSG\_SEQ<sub>s</sub>,  
 26 SYS\_PAR\_MSG\_SEQ<sub>s</sub>, ACC\_MSG\_SEQ<sub>s</sub>, NGHBR\_LST\_MSG\_SEQ<sub>s</sub>,  
 27 CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and  
 28 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> variables to NULL (see 6.6.2.2);
- 29 • Set IMSI<sub>11\_12s</sub> and MCC<sub>s</sub> to NULL; and
- 30 • Perform registration initialization as specified in 6.6.5.5.1.3.

31 The mobile station shall enter the *Mobile Station Idle State*.

32

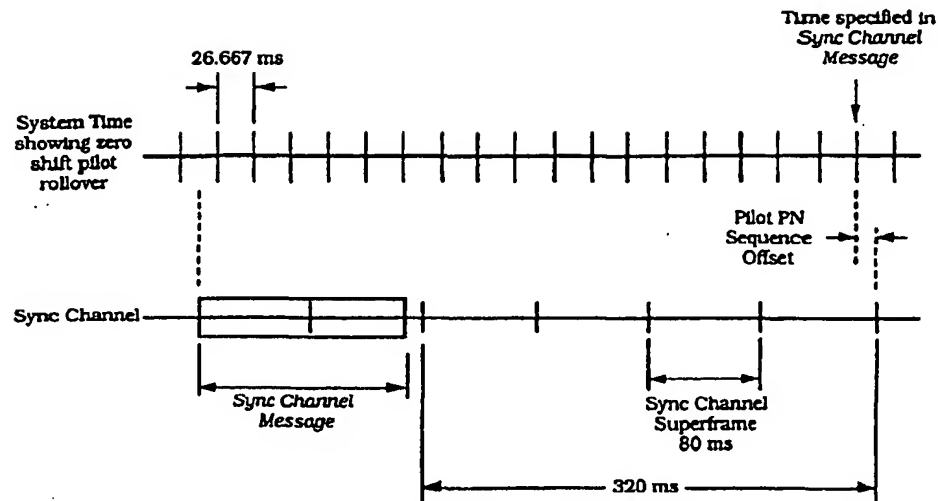


Figure 6.6.1.4-1. Mobile Station Internal Timing

#### 6.6.2 Mobile Station Idle State

In this state, the mobile station monitors the Paging Channel. The mobile station can receive messages, receive an incoming call (mobile station terminated call), initiate a call (mobile station originated call), initiate a registration, or initiate a message transmission.

Upon entering the *Mobile Station Idle State*, the mobile station shall set its code channel to  $PAGECH_s$ , shall set the Paging Channel data rate as determined by  $PRAT_s$  and shall perform Paging Channel supervision as specified in 6.4.3.

If  $REDIRECTION_s$  is equal to disabled, the mobile station may exit the *Mobile Station Idle State* at any time and enter the *System Determination Substate* of the *Mobile Station Initialization State* with a reselection indication (see 6.6.1.1).

While in the *Mobile Station Idle State*, the mobile station shall perform the following procedures:

- The mobile station shall perform Paging Channel monitoring procedures as specified in 6.6.2.1.1.
- The mobile station shall perform message acknowledgement procedures as specified in 6.6.2.1.2.
- The mobile station shall perform registration procedures as specified in 6.6.2.1.3.
- The mobile station shall perform idle handoff procedures as specified in 6.6.2.1.4.
- The mobile station shall perform the *Response to Overhead Information Operation* as specified in 6.6.2.2 whenever the mobile station receives a system overhead message (*System Parameters Message*, *CDMA Channel List Message*, *Extended System*

- 1        *Parameters Message, Neighbor List Message, Global Service Redirection Message, or*  
 2        *Access Parameters Message).*
- 3        • The mobile station shall perform the *Mobile Station Page Match Operation* as specified  
 4        in 6.6.2.3 whenever it receives a *General Page Message, Page Message, or Slotted*  
 5        *Page Message.*
  - 6        • The mobile station shall perform the *Mobile Station Order and Message Processing*  
 7        *Operation* as specified in 6.6.2.4 whenever a message or order directed to the mobile  
 8        station is received other than a *General Page Message, Page Message, or Slotted Page*  
 9        *Message.*
  - 10       • The mobile station shall perform the *Mobile Station Origination Operation* as specified  
 11       in 6.6.2.5 if directed by the user to initiate a call.
  - 12       • If the mobile station supports *Data Burst Message* transmission, it shall perform the  
 13       *Mobile Station Message Transmission Operation* as specified in 6.6.2.6 if directed by  
 14       the user to transmit a message.
  - 15       • The mobile station shall perform the *Mobile Station Power-Down Operation* as  
 16       specified in 6.6.2.7 if directed by the user to power down.
- 17    6.6.2.1 Idle Procedures
- 18    6.6.2.1.1 Paging Channel Monitoring Procedures
- 19    6.6.2.1.1.1 General Overview
- 20    The Paging Channel is divided into 80 ms slots called Paging Channel slots. Paging and  
 21    control messages for a mobile station operating in the non-slotted mode can be received in  
 22    any of the Paging Channel slots. Therefore, the non-slotted mode of operation requires the  
 23    mobile station to monitor all slots.
- 24    The Paging Channel protocol also provides for scheduling the transmission of messages for  
 25    a specific mobile station in certain assigned slots. Support of this feature is optional and  
 26    may be enabled by each mobile station. A mobile station that monitors the Paging Channel  
 27    only during certain assigned slots is referred to as operating in the slotted mode. During  
 28    the slots in which the Paging Channel is not being monitored, the mobile station can stop  
 29    or reduce its processing for power conservation. A mobile station may not operate in the  
 30    slotted mode in any state except the *Mobile Station Idle State.*
- 31    A mobile station operating in the slotted mode generally monitors the Paging Channel for  
 32    one or two slots per slot cycle. The mobile station can specify its preferred slot cycle using  
 33    the *SLOT\_CYCLE\_INDEX* field in the *Registration Message, Origination Message, or Page*  
 34    *Response Message.* The mobile station can also specify its preferred slot cycle using the  
 35    *SLOT\_CYCLE\_INDEX* field of the *Terminal Information* record of the *Status Message* when in  
 36    the *Mobile Station Control on the Traffic Channel State.* The length of the slot cycle, *T*, in  
 37    units of 1.28 seconds,<sup>12</sup> is given by

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<sup>12</sup>The minimum length slot cycle consists of 16 slots of 80 ms each, hence 1.28 seconds.

$$T = 2^i$$

where  $i$  is the selected slot cycle index (see 6.6.2.1.1.3).

A mobile station operating in the slotted mode may optionally monitor additional slots to receive broadcast messages and/or broadcast pages, using the procedures defined in 2.4.1.2.2 of TIA/EIA/IS-637.

There are  $16 \times T$  slots in a slot cycle.

SLOT\_NUM is the Paging Channel slot number, modulo the maximum length slot cycle (2048 slots). That is, the value of SLOT\_NUM is

$$\text{SLOT\_NUM} = \lfloor t/4 \rfloor \bmod 2048,$$

where  $t$  is the System Time in frames. For each mobile station, the starting times of its slot cycles are offset from the slot in which SLOT\_NUM equals zero by a fixed, randomly selected number of slots as specified in 6.6.2.1.1.3.

Figure 6.6.2.1.1.1-1 shows an example for a slot cycle length of 1.28 seconds, in which the computed value of PGSLOT (see 6.6.2.1.1.3) is equal to 6, so that one of the mobile station's slot cycles begins when SLOT\_NUM equals 6. The mobile station begins monitoring the Paging Channel at the start of the slot in which SLOT\_NUM equals 6. The next slot in which the mobile station must begin monitoring the Paging Channel is 16 slots later, i.e., the slot in which SLOT\_NUM is 22.

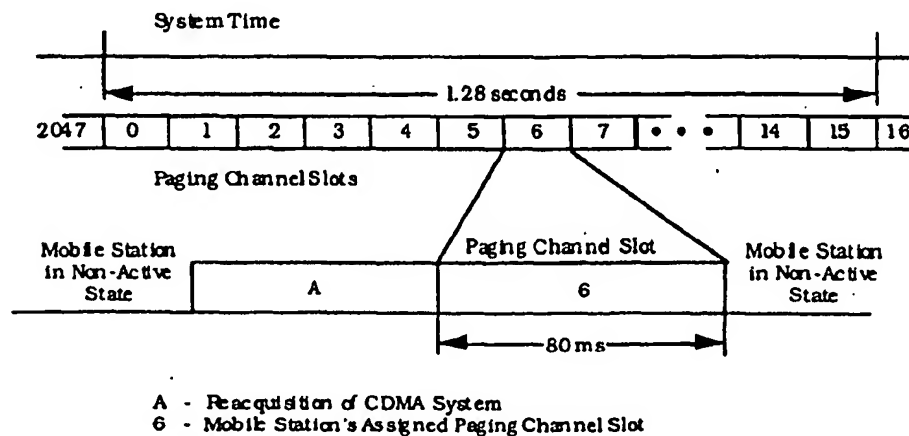


Figure 6.6.2.1.1.1-1. Mobile Station Idle Slotted Mode Structure Example (see text)

Slotted Page Messages contain a field called MORE\_PAGES which, when set to '0' during a mobile station's assigned slot, indicates that the remainder of the slot will contain no more messages addressed to that mobile station. This allows a mobile station operating in the slotted mode to stop monitoring the Paging Channel as soon as possible.



1 *General Page Messages* contain two fields, CLASS\_0\_DONE and CLASS\_1\_DONE, which  
2 indicate when a mobile station operating in the slotted mode may stop monitoring the  
3 Paging Channel. When CLASS\_0\_DONE is set to '1' during a mobile station's assigned slot,  
4 the mobile station has a class 0 IMSI assigned, and the mobile station is operating in the  
5 slotted mode, no further messages or records will be directed to the mobile station during  
6 the current slot. Similarly, when CLASS\_1\_DONE is set to '1' during a mobile station's  
7 assigned slot, the mobile station has a class 1 IMSI assigned, and the mobile station is  
8 operating in the slotted mode, no further messages or records will be directed to the mobile  
9 station during the current slot.

10 A mobile station which is operating in the slotted mode and which has a class 0 IMSI  
11 assigned may stop monitoring the Paging Channel after processing a *General Page Message*  
12 containing CLASS\_0\_DONE equal to '1'. Similarly, a mobile station which is operating in  
13 the slotted mode and which has a class 1 IMSI assigned may stop monitoring the Paging  
14 Channel after processing a *General Page Message* containing CLASS\_1\_DONE equal to '1'.

15 The mobile station continues to monitor the Paging Channel for one additional slot unless,  
16 within its assigned slot, the mobile station receives a *General Page Message* containing the  
17 appropriate indicator permitting it to stop monitoring the Paging Channel (CLASS\_0\_DONE  
18 or CLASS\_1\_DONE equal to '1', whichever is appropriate) or the mobile station receives a  
19 *Slotted Page Message* with the MORE\_PAGES field equal to '0'. This allows the base station  
20 to carry over a message begun in the assigned slot into the following slot if necessary.

#### 21 6.6.2.1.1.2 Non-Slotted Mode Requirements

22 A mobile station operating in the non-slotted mode shall monitor the Paging Channel at all  
23 times. If the mobile station declares loss of the Paging Channel (see 6.4.3), the mobile  
24 station shall enter the *System Determination Substate* of the *Mobile Station Initialization*  
25 *State* with a system lost indication (see 6.6.1.1).

26 When a mobile station monitors the Paging Channel in any state other than the *Mobile*  
27 *Station Idle State*, it shall operate in the non-slotted mode.

#### 28 6.6.2.1.1.3 Slotted Mode Requirements

29 The mobile station shall not operate in the slotted mode unless bit 5 of the station class  
30 mark is set to '1' (see 2.3.3).

31 During operation in the slotted mode, the mobile station shall ensure that its stored  
32 configuration parameter values are current (see 6.6.2.2). The mobile station shall not  
33 operate in the slotted mode if its configuration parameters are not current.

34 If the mobile station declares a loss of the Paging Channel (see 6.4.3), the mobile station  
35 shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a  
36 system lost indication (see 6.6.1.1).

#### 37 6.6.2.1.1.3.1 Monitoring Assigned Slots

38 For each of its assigned slots, and for slots monitored to receive broadcast pages and  
39 broadcast messages (see 2.4.1.2.2 of TIA/EIA/IS-637), the mobile station shall begin  
40 monitoring the Paging Channel in time to receive the first bit of the slot. The mobile station

1 shall continue to monitor the Paging Channel until one of the following conditions is  
 2 satisfied:

- 3 • The mobile station receives a *Slotted Page Message* with the MORE\_PAGES field set  
 4 to '0';
- 5 • The mobile station is not configured to receive broadcast addresses, the mobile  
 6 station has a class 0 IMSI assigned and receives a *General Page Message* with  
 7 CLASS\_0\_DONE set to '1';
- 8 • The mobile station is not configured to receive broadcast addresses, the mobile  
 9 station has a class 1 IMSI assigned and receives a *General Page Message* with  
 10 CLASS\_1\_DONE set to '1';
- 11 • The mobile station is configured to receive broadcast addresses, the mobile station  
 12 has a class 0 IMSI assigned, and the mobile station receives a *General Page Message*  
 13 with BROADCAST\_DONE set to '1', and receives a *General Page Message* with  
 14 CLASS\_0\_DONE set to '1';
- 15 • The mobile station is configured to receive broadcast addresses, the mobile station  
 16 has a class 1 IMSI assigned, and the mobile station receives a *General Page Message*  
 17 with BROADCAST\_DONE set to '1', and receives a *General Page Message* with  
 18 CLASS\_1\_DONE set to '1'; or
- 19 • The mobile station monitors the assigned slot and the slot following the assigned slot,  
 20 and the mobile station receives at least one valid message (see 6.4.3).

21 To determine its assigned slots, the mobile station shall use the hash function specified in  
 22 6.6.7.1 to select a number, PGSLOT, in the range 0 to 2047 (spanning the maximum slot  
 23 cycle length, which is 163.84 seconds). The mobile station's assigned slots shall be those  
 24 slots in which

$$25 \quad \lfloor t/4 \rfloor - \text{PGSLOT} \bmod (16 \times T) = 0,$$

26 where  $t$  is the System Time in frames and  $T$  is the slot cycle length in units of 1.28 seconds  
 27 given by

$$28 \quad T = 2^l,$$

29 where  $l$  is the slot cycle index.

#### 30 6.6.2.1.1.3.2 Determination of the Slot Cycle Index

31 If the SID and NID of the current base station (SID<sub>s</sub> and NID<sub>s</sub>, as stored from the *System*  
 32 *Parameters Message*) do not match any entry of SID\_NID\_LIST<sub>s</sub>, the mobile station shall  
 33 use a slot cycle index no greater than the smaller of MAX\_SLOT\_CYCLE\_INDEX<sub>s</sub> and 1;  
 34 otherwise, the mobile station shall use a slot cycle index no greater than  
 35 SLOT\_CYCLE\_INDEX<sub>s</sub> (see 6.6.2.2.1.6).

36 If the mobile station is directed by the user to modify the preferred slot cycle index  
 37 (SLOT\_CYCLE\_INDEX<sub>p</sub>), the mobile station shall perform parameter-change registration  
 38 (see 6.6.5.1.6).

#### 6.6.2.1.2 Acknowledgement Procedures

Acknowledgement procedures facilitate the reliable exchange of messages between the base station and the mobile station. The mobile station uses the fields ACK\_TYPE (acknowledgement address type), ACK\_SEQ (acknowledgement sequence number), MSG\_SEQ (message sequence number), ACK\_REQ (acknowledgement required), and VALID\_ACK (valid acknowledgement) to support this mechanism. These fields are referred to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2 procedures. All other message fields and the processing thereof are referred to as pertaining to layer 3. (See Appendix C for further discussion of layering.)

Acknowledgements of messages received on the Paging Channel shall be sent on the Access Channel (see 6.6.3).

When sending a message that includes an acknowledgement, the mobile station shall set the VALID\_ACK field to '1' and shall set the ACK\_TYPE and ACK\_SEQ fields equal to the ADDR\_TYPE and MSG\_SEQ fields, respectively, of the message being acknowledged. For acknowledgement of a *Page Message* or *Slotted Page Message*, the mobile station shall set the ACK\_SEQ field equal to the MSG\_SEQ field of the record addressed to the mobile station, and shall set the ACK\_TYPE field to '000'. For acknowledgement of a *General Page Message*, the mobile station shall set the ACK\_SEQ field equal to the MSG\_SEQ field of the record addressed to the mobile station and shall set the ACK\_TYPE field to '010'.

When sending a message that does not include an acknowledgement, the mobile station shall set the VALID\_ACK field to '0' and shall set the ACK\_TYPE and ACK\_SEQ fields equal to the ADDR\_TYPE and MSG\_SEQ fields, respectively, of the last message received that required acknowledgement. If no such message has been received, the mobile station shall set the ACK\_TYPE field to '000' and shall set the ACK\_SEQ field to '111'.

Unless otherwise specified in the requirements for processing a specific message, the mobile station shall transmit an acknowledgement in response to any message received that is addressed to the mobile station and that has the ACK\_REQ field set to '1'. The mobile station shall transmit a *Page Response Message* including an acknowledgement in response to each record of a *Page Message*, *Slotted Page Message*, or *General Page Message* addressed to the mobile station.<sup>13</sup> If a specific message is required in response to any other message requiring acknowledgement, the acknowledgement shall be included with the response. If no specific message is required to be transmitted in response to a received message requiring acknowledgement, the mobile station shall include the acknowledgement in a *Mobile Station Acknowledgement Order* (see 6.7.3).

If no message requiring acknowledgement has been received, the mobile station shall not include an acknowledgement in any transmitted message until a message is received that requires acknowledgement. After a message including an acknowledgement has been sent, the mobile station shall not include an acknowledgement in any subsequent transmitted message until another message is received that requires acknowledgement.

The mobile station shall detect duplicate received messages by the following rules.

---

<sup>13</sup>These messages do not have an ACK\_REQ field.

1 The mobile station shall consider two messages or records (except records in *Page*  
2 *Messages*, *Slotted Page Messages*, and *General Page Messages*) to be duplicates if all of the  
3 following are true:

- 4 • The messages (records) were received on the same Paging Channel; and
- 5 • The messages (records) contain the same values in both the MSG\_SEQ and  
6 ACK\_REQ fields;<sup>14</sup> and
- 7 • The messages (records) were received within  $T_{4m}$  seconds (see Appendix D) of each  
8 other (see Figure 6.6.2.1.2-1); and
- 9 • An address match was declared (see 6.6.2.1.5) for both messages (records).

10 The mobile station shall consider two page records (as contained in *Page Messages*, *Slotted*  
11 *Page Messages*, and *General Page Messages*) to be duplicates if all of the following are true:

- 12 • The records were received on the same Paging Channel; and
- 13 • The records contain the same values in the MSG\_SEQ field; and
- 14 • The records were received in messages received within  $T_{4m}$  seconds of each other  
15 (see Figure 6.6.2.1.2-1), or in the same message; and
- 16 • A page match was declared (see 6.6.2.3) for both records.

17 The mobile station shall then discard, without further processing, any message or page  
18 record that is a duplicate of one previously received.

19 Paging Channels shall be considered different if any of the following is true:

- 20 • The Paging Channels are transmitted by different base stations, or
- 21 • The Paging Channels are transmitted on different code channels (see 7.1.3.4.8), or
- 22 • The Paging Channels are transmitted on different CDMA Channels (see 7.1.1.1).

23 The mobile station shall consider messages to be different if they are not duplicates  
24 according to the rules given above. The mobile station shall process all messages that are  
25 considered to be different.

26

---

<sup>14</sup>Separate sequence numbers are used for messages requiring acknowledgement and messages not requiring acknowledgement on the Paging Channel.

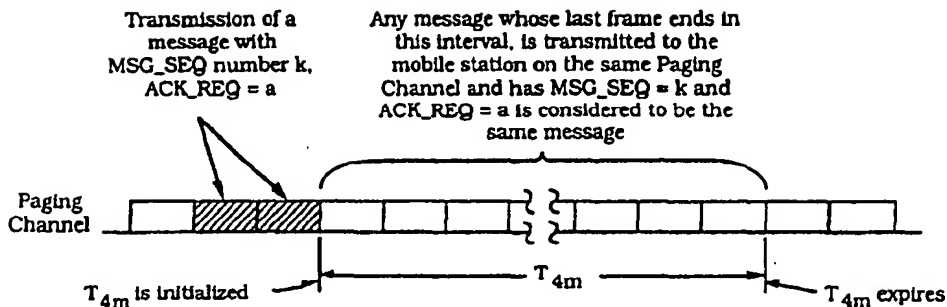


Figure 6.6.2.1.2-1. Time Interval for Duplicate Message Detection

#### 6.6.2.1.3 Registration

While in the *Mobile Station Idle State*, the mobile station shall perform the registration procedures specified in 6.6.5.5.2.1.

#### 6.6.2.1.4 Idle Handoff

##### 6.6.2.1.4.1 Pilot Search

An idle handoff occurs when a mobile station has moved from the coverage area of one base station into the coverage area of another base station during the *Mobile Station Idle State*. If the mobile station detects a Pilot Channel signal from another base station, that is sufficiently stronger than that of the current base station, the mobile station determines that an idle handoff should occur.

Pilot Channels are identified by their offsets relative to the zero offset pilot PN sequence (see 7.1.3.2.1). Pilot offsets are grouped into sets describing their status with regard to pilot searching.

The following sets of pilot offsets are defined for a mobile station in the *Mobile Station Idle State*. Each pilot offset is a member of only one set.

- Active Set: The pilot offset of the Forward CDMA Channel whose Paging Channel is being monitored.
- Neighbor Set: The offsets of the Pilot Channels that are likely candidates for idle handoff. The members of the Neighbor Set are specified in the *Neighbor List Message*.
- Remaining Set: The set of all possible pilot offsets in the current system (integer multiples of  $PILOT\_INC_S$ ) on the current CDMA frequency assignment, excluding the pilots in the Neighbor Set and the Active Set.

The mobile station shall support a Neighbor Set size of at least  $N_{8m}$  pilots (see Appendix D).

In the *Mobile Station Idle State*, the mobile station shall continuously search for the strongest Pilot Channel signal on the current CDMA frequency assignment ( $CDMACH_S$ )

1 whenever it monitors the Paging Channel. Search performance criteria are defined in IS-98  
 2 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread  
 3 Spectrum Cellular Mobile Stations."

4 This search should be governed by the following:

- 5 • Active Set: The search window size for the pilot in the Active Set should be the  
 6 number of PN chips specified in Table 6.6.6.2.1-1 corresponding to SRCH\_WIN\_A<sub>s</sub>.  
 7 The mobile station should center the search window for the pilot of the Active Set  
 8 around the earliest arriving usable multipath component of the pilot. If the mobile  
 9 station receives a value greater than or equal to 13 for SRCH\_WIN\_A<sub>r</sub>, it may store  
 10 and use the value 13 in SRCH\_WIN\_A<sub>s</sub>.
- 11 • Neighbor Set: The search window size for each pilot in the Neighbor Set should be  
 12 the number of PN chips specified in Table 6.6.6.2.1-1 corresponding to  
 13 SRCH\_WIN\_N<sub>s</sub>. The mobile station should center the search window for each pilot in  
 14 the Neighbor Set around the pilot's PN sequence offset using timing defined by the  
 15 mobile station's time reference (see 6.1.5.1).
- 16 • Remaining Set: The search window size for each pilot in the Remaining Set should  
 17 be the number of PN chips specified in Table 6.6.6.2.1-1 corresponding to  
 18 SRCH\_WIN\_R<sub>s</sub>. The mobile station should center the search window for each pilot in  
 19 the Remaining Set around the pilot's PN sequence offset using timing defined by the  
 20 mobile station's time reference (see 6.1.5.1). The mobile station should only search  
 21 for Remaining Set pilots whose pilot PN sequence offset indices are equal to integer  
 22 multiples of PILOT\_INC<sub>s</sub>.

23 If the mobile station determines that one of the Neighbor Set or Remaining Set Pilot  
 24 Channel signals is sufficiently stronger than the Pilot Channel of the Active Set, the mobile  
 25 station should perform an idle handoff as specified in 6.6.2.1.4.2.

#### 26 6.6.2.1.4.2 Idle Handoff Procedures

27 While performing an idle handoff, the mobile station shall operate in the non-slotted mode  
 28 until the mobile station has received at least one valid message on the new Paging Channel.  
 29 Following the reception of this message the mobile station may resume slotted mode  
 30 operation in accordance with 6.6.2.1.1.3. After performing an idle handoff, the mobile  
 31 station shall discard all unprocessed messages received on the old Paging Channel.

32 If the new base station is listed in the *Neighbor List Message* from the old base station (see  
 33 6.6.2.2.3), the mobile station shall use the 3-bit NGHBR\_CONFIG field to determine the  
 34 actions required to transition to the new base station. If the new base station is not listed  
 35 in the *Neighbor List Message*, the mobile station shall perform the handoff operation using  
 36 the same procedure as for a pilot in the list with the NGHBR\_CONFIG field set to '011'.

37 If the NGHBR\_CONFIG field is '000', the mobile station shall set ACC\_MSG\_SEQ<sub>s</sub> to NULL  
 38 (see 6.6.2.2) and shall set PILOT\_PN<sub>s</sub> to the pilot offset index of the base station  
 39 transmitting the new Paging Channel. If the mobile station has not stored configuration  
 40 parameters for the new Paging Channel, or if the stored information is not current (see  
 41 6.6.2.2), the mobile station shall set CONFIG\_MSG\_SEQ<sub>s</sub>, SYS\_PAR\_MSG\_SEQ<sub>s</sub>,  
 42 NGHBR\_LST\_MSG\_SEQ<sub>s</sub>, CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and

1 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> to NULL. The mobile station shall begin monitoring the  
 2 Paging Channel of the new base station, using the same Code Channel and CDMA Channel.  
 3 If the NGHBR\_CONFIG field is '001', the mobile station shall set ACC\_MSG\_SEQ<sub>s</sub> to NULL  
 4 and shall set PILOT\_PN<sub>s</sub> to the pilot offset index of the base station transmitting the new  
 5 Paging Channel. If the mobile station has not stored configuration parameters for the  
 6 Primary Paging Channel of the new base station, or if the stored information is not current  
 7 (see 6.6.2.2), the mobile station shall set CONFIG\_MSG\_SEQ<sub>s</sub>, SYS\_PAR\_MSG\_SEQ<sub>s</sub>,  
 8 NGHBR\_LST\_MSG\_SEQ<sub>s</sub>, CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and  
 9 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> to NULL. The mobile station shall set PAGE\_CHAN<sub>s</sub> to '1'  
 10 and PAGECH<sub>s</sub> to the Primary Paging Channel. The mobile station shall begin monitoring  
 11 the Primary Paging Channel of the new base station, using the same CDMA Channel.

12 If the NGHBR\_CONFIG field is '010', the mobile station shall set ACC\_MSG\_SEQ<sub>s</sub> to NULL  
 13 and shall set PILOT\_PN<sub>s</sub> to the pilot offset index of the base station transmitting the new  
 14 Paging Channel. If the mobile station has not stored configuration parameters for the  
 15 Primary Paging Channel of the new base station, or if the stored information is not current  
 16 (see 6.6.2.2), the mobile station shall set CONFIG\_MSG\_SEQ<sub>s</sub>, SYS\_PAR\_MSG\_SEQ<sub>s</sub>,  
 17 NGHBR\_LST\_MSG\_SEQ<sub>s</sub>, CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and  
 18 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> to NULL. The mobile station shall set PAGE\_CHAN<sub>s</sub> to '1'  
 19 and PAGECH<sub>s</sub> to the Primary Paging Channel. The mobile station shall set CDMACH<sub>s</sub> to  
 20 the first CDMA Channel given in the *CDMA Channel List Message* for the old base station,  
 21 tune to the new CDMA channel, and begin monitoring the Primary Paging Channel of the  
 22 new base station.

23 If the NGHBR\_CONFIG field is '011', the mobile station shall enter the *System*  
 24 *Determination Substate* of the *Mobile Station Initialization State* with a new system indication  
 25 (see 6.6.1.1).

#### 26 6.6.2.1.5 Address Recognition for Other than Page Messages

27 When the mobile station monitors the Paging Channel, the mobile station shall use the  
 28 following rules to determine an address match.

29 If the ADDR\_TYPE is equal to '000' (the address is a MIN address), the mobile station shall  
 30 declare an address match if the addressed MIN equals the mobile station's IMSI\_S.

31 If the ADDR\_TYPE is equal to '001' (the address is an ESN address), the mobile station shall  
 32 declare an address match if the addressed ESN equals the mobile station's ESN.

33 If the ADDR\_TYPE is equal to '010' (the address is an IMSI address), the mobile station  
 34 shall use the following procedures:

- 35 • If IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '00', the mobile  
 36 station shall declare an address match if the following conditions are met:
  - 37 - The mobile station has been assigned a class 0 IMSI (see 6.3.1),
  - 38 - IMSI<sub>11\_12p</sub> is equal to IMSI<sub>11\_12s</sub>,
  - 39 - IMSI<sub>S<sub>p</sub></sub> is equal to the IMSI\_S received in the IMSI class 0 type specific subfield  
 40 (see 7.7.2.3.1), and

- 1       -  $MCC_p$  is equal to  $MCC_s$ .
- 2       • If  $IMSI\_CLASS$  is equal to '0' and  $IMSI\_CLASS\_O\_TYPE$  is equal to '01', the mobile  
3       station shall declare an address match if the following conditions are met:
  - 4       - The mobile station has been assigned a class 0 IMSI,
  - 5       -  $IMSI\_S_p$  is equal to the  $IMSI\_S$  received in the IMSI class 0 type specific subfield  
6       (see 7.7.2.3.1),
  - 7       -  $IMSI\_11\_12_p$  is equal to the  $IMSI\_11\_12$  received in the IMSI class 0 type specific  
8       subfield (see 7.7.2.3.1), and
  - 9       - The  $MCC_p$  is equal to  $MCC_s$ .
- 10      • If  $IMSI\_CLASS$  is equal to '0' and  $IMSI\_CLASS\_O\_TYPE$  is equal to '10', the mobile  
11      station shall declare an address match if the following conditions are met:
  - 12      - The mobile station has been assigned a class 0 IMSI,
  - 13      -  $IMSI\_S_p$  is equal to the  $IMSI\_S$  received in the IMSI class 0 type specific subfield  
14      (see 7.7.2.3.1),
  - 15      -  $IMSI\_11\_12_p$  is equal to  $IMSI\_11\_12_s$ , and
  - 16      -  $MCC_p$  is equal to the MCC received in the IMSI class 0 type specific subfield (see  
17      7.7.2.3.1).
- 18      • If  $IMSI\_CLASS$  is equal to '0' and  $IMSI\_CLASS\_O\_TYPE$  is equal to '11', the mobile  
19      station shall declare an address match if the following conditions are met:
  - 20      - The mobile station has been assigned a class 0 IMSI,
  - 21      -  $IMSI\_S_p$  is equal to the  $IMSI\_S$  received in the IMSI class 0 type specific subfield  
22      (see 7.7.2.3.1),
  - 23      -  $IMSI\_11\_12_p$  is equal to the  $IMSI\_11\_12$  received in the IMSI class 0 type specific  
24      subfield (see 7.7.2.3.1), and
  - 25      -  $MCC_p$  is equal to the MCC received in the IMSI class 0 type specific subfield (see  
26      7.7.2.3.1).
- 27      • If  $IMSI\_CLASS$  is equal to '1' and  $IMSI\_CLASS\_1\_TYPE$  is equal to '0', the mobile  
28      station shall declare an address match if the following conditions are met:
  - 29      - The mobile station has been assigned a class 1 IMSI (see 6.3.1),
  - 30      -  $IMSI\_S_p$  is equal to the  $IMSI\_S$  received in the IMSI class 1 type specific subfield  
31      (see 7.7.2.3.1),
  - 32      -  $IMSI\_11\_12_p$  is equal to the  $IMSI\_11\_12$  received in the IMSI class 1 type specific  
33      subfield (see 7.7.2.3.1),
  - 34      -  $MCC_p$  is equal to  $MCC_s$ , and
  - 35      - The number of digits in the NMSI assigned to the mobile station is equal to four  
36      plus the  $IMSI\_ADDR\_NUM$  received in the IMSI class 1 type specific subfield (see  
37      7.7.2.3.1).



- 1 • If IMSI\_CLASS is equal to '1' and IMSI\_CLASS\_1\_TYPE is equal to '1', the mobile
- 2 station shall declare an address match if the following conditions are met:
- 3     - The mobile station has been assigned a class 1 IMSI,
- 4     - IMSI\_S<sub>p</sub> is equal to the IMSI\_S received in the IMSI class 1 type specific subfield
- 5       (sec 7.7.2.3.1),
- 6     - IMSI\_11\_12<sub>p</sub> is equal to the IMSI\_11\_12 received in the IMSI class 1 type specific
- 7       subfield (sec 7.7.2.3.1),
- 8     - MCC<sub>p</sub> is equal to the MCC received in the IMSI class 1 type specific subfield (see
- 9       7.7.2.3.1), and
- 10    - The number of digits in the NMSI assigned to the mobile station is equal to four
- 11      plus the IMSI\_ADDR\_NUM received in the IMSI class 1 type specific subfield (see
- 12       7.7.2.3.1).

13 If the ADDR\_TYPE is equal to '101' (the address is a broadcast address), the mobile station  
 14 shall declare an address match if the following conditions are met:

- 15 • The mobile station is configured to receive broadcast addresses;
- 16 • The message is a *Data Burst Message*;
- 17 • The ADDRESS field of the *Data Burst Message* is equal to a broadcast address that
- 18    the mobile station is configured to receive; and
- 19 • The BURST\_TYPE field of the *Data Burst Message* is equal to a burst type that the
- 20    mobile station is configured to receive.

#### 21 6.6.2.2 Response to Overhead Information Operation

22 The overhead messages on the Paging Channel are:

- 23 • *System Parameters Message*
- 24 • *Access Parameters Message*
- 25 • *Neighbor List Message*
- 26 • *CDMA Channel List Message*
- 27 • *Extended System Parameters Message*
- 28 • *Global Service Redirection Message*

29 The *Response to Overhead Information Operation* is performed whenever the mobile station  
 30 receives an overhead message. The mobile station updates internally stored information  
 31 from the received message's data fields.

32 Configuration parameters and access parameters are received in the configuration  
 33 messages and the *Access Parameters Message*. The configuration messages are:

- 34 • *System Parameters Message*
- 35 • *Neighbor List Message*
- 36 • *CDMA Channel List Message*

- 1 • *Extended System Parameters Message*
- 2 • *Global Service Redirection Message*

3 Associated with the set of configuration messages sent on each Paging Channel is a  
 4 configuration message sequence number (CONFIG\_MSG\_SEQ). When the contents of one  
 5 or more of the configuration messages change, the configuration message sequence number  
 6 is incremented. For each of the configuration messages received, the mobile station stores  
 7 the configuration message sequence number contained in the configuration message  
 8 (SYS\_PAR\_MSG\_SEQ<sub>s</sub>, NGHBR\_LIST\_MSG\_SEQ<sub>s</sub>, CHAN\_LIST\_MSG\_SEQ<sub>s</sub>, EXT-  
 9 \_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, or GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub>). The mobile station also stores  
 10 the most recently received configuration message sequence number (CONFIG\_MSG\_SEQ<sub>s</sub>)  
 11 contained in any message [see 6.6.2.2.1, 6.6.2.2.3, 6.6.2.2.4, 6.6.2.2.5, 6.6.2.2.6, and  
 12 6.6.2.3]. The mobile station examines the stored values of the configuration message  
 13 sequence numbers to determine whether the configuration parameters stored by the mobile  
 14 station are current.

15 The field EXT\_SYS\_PARAMETER in the *System Parameters Message*, when set equal to '0',  
 16 indicates that the base station is not sending the *Extended System Parameters Message*.  
 17 When the mobile station receives the *System Parameters Message* with the  
 18 EXT\_SYS\_PARAMETER field set equal to '0', it indicates that the *Extended System*  
 19 *Parameters Message* is current by setting EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub> to  
 20 CONFIG\_MSG\_SEQ<sub>s</sub>.

21 The field GLOBAL\_REDIRECT in the *System Parameters Message*, when set equal to '0',  
 22 indicates that the base station is not sending the *Global Service Redirection Message*. When  
 23 the mobile station receives the *System Parameters Message* with the GLOBAL\_REDIRECT  
 24 field set equal to '0', it indicates that the *Global Service Redirection Message* is current by  
 25 setting GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> to CONFIG\_MSG\_SEQ<sub>s</sub>.

26 The configuration message sequence number is also included in the *General Page Message*,  
 27 *Page Message*, and the *Slotted Page Message*. This allows the mobile station to determine  
 28 whether the stored configuration parameters are current without waiting for a configuration  
 29 message.

30 *Access Parameters Messages* are independently sequence-numbered by the ACC\_MSG\_SEQ  
 31 field. The mobile station stores the most recently received *Access Parameters Message*  
 32 sequence number (ACC\_MSG\_SEQ<sub>s</sub>).

33 Paging Channels shall be considered different if they are transmitted by different base  
 34 stations, if they are transmitted on different code channels, or if they are transmitted on  
 35 different CDMA Channels. Configuration and access parameters from one Paging Channel  
 36 shall not be used while monitoring a different Paging Channel. The mobile station shall  
 37 ignore any overhead message whose PILOT\_PN<sub>r</sub> field is not equal to the pilot offset index  
 38 (PILOT\_PN<sub>s</sub>) of the base station whose Paging Channel is being monitored.

39 The mobile station may store the configuration parameters from Paging Channels it has  
 40 recently monitored. When a mobile station starts monitoring a Paging Channel that it has  
 41 recently monitored, the mobile station can determine whether the stored parameters are  
 42 current by examining the CONFIG\_MSG\_SEQ<sub>s</sub> in a configuration message, a *General Page*  
 43 *Message*, a *Slotted Page Message*, or a *Page Message*.

1 The mobile station shall define a special value, NULL, to be stored in place of sequence  
 2 numbers for messages that have not been received or are marked as not current. The  
 3 special value NULL shall be unequal to any valid message sequence number.

4 The mobile station shall consider the stored configuration parameters to be current only if  
 5 all the following conditions are true:

- 6 • All stored configuration message sequence numbers (SYS\_PAR\_MSG\_SEQ<sub>s</sub>,  
 7 NGHBR\_LIST\_MSG\_SEQ<sub>s</sub>, CHAN\_LIST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and  
 8 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub>) are equal to CONFIG\_MSG\_SEQ<sub>s</sub>; and
- 9 • CONFIG\_MSG\_SEQ<sub>s</sub> is not equal to NULL; and
- 10 • No more than T<sub>31m</sub> seconds (see Appendix D) have elapsed since the mobile station  
 11 last received a valid message on the Paging Channel for which the parameters were  
 12 stored.

13 If the stored parameters are current, the mobile station shall process the parameters as  
 14 described in 6.6.2.2.1, 6.6.2.2.3, 6.6.2.2.4, 6.6.2.2.5, and 6.6.2.2.6.

#### 15 6.6.2.2.1 System Parameters Message

16 Whenever a *System Parameters Message* is received on the Paging Channel, the  
 17 configuration message sequence number, CONFIG\_MSG\_SEQ<sub>r</sub>, shall be compared to that  
 18 stored in SYS\_PAR\_MSG\_SEQ<sub>s</sub>. If the comparison results in a match, the mobile station  
 19 may ignore the message. If the comparison results in a mismatch, then the mobile station  
 20 shall process the remaining fields in the message as described in 6.6.2.2.1.1, 6.6.2.2.1.2,  
 21 6.6.2.2.1.3, 6.6.2.2.1.4, 6.6.2.2.1.5, and 6.6.2.2.1.6.

22 If PAGE\_CHAN, REG\_PRD, BASE\_LAT, BASE\_LONG, or PWR\_REP\_THRESH are not within  
 23 the valid ranges specified in 7.7.2.3.2.1, then the mobile station shall ignore the *System*  
 24 *Parameters Message* that contains them.

#### 25 6.6.2.2.1.1 Stored Parameters

26 The mobile station shall store the following parameters:

- 27 • Configuration message sequence number  
 28 (CONFIG\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>,  
 29 SYS\_PAR\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>)
- 30 • System identification (SID<sub>s</sub> = SID<sub>r</sub>)
- 31 • Network identification (NID<sub>s</sub> = NID<sub>r</sub>)
- 32 • Registration zone (REG\_ZONE<sub>s</sub> = REG\_ZONE<sub>r</sub>)
- 33 • Number of registration zones to be retained (TOTAL\_ZONES<sub>s</sub> = TOTAL\_ZONES<sub>r</sub>)
- 34 • Zone timer length (ZONE\_TIMER<sub>s</sub> = ZONE\_TIMER<sub>r</sub>)
- 35 • Multiple SID storage indicator (MULT\_SIDS<sub>s</sub> = MULT\_SIDS<sub>r</sub>)
- 36 • Multiple NID storage indicator (MULT\_NIDS<sub>s</sub> = MULT\_NIDS<sub>r</sub>)
- 37 • Base station identification (BASE\_ID<sub>s</sub> = BASE\_ID<sub>r</sub>)

- 1 • Base station class ( $BASE\_CLASS_s = BASE\_CLASS_r$ )
- 2 • Maximum slot cycle index
- 3 ( $MAX\_SLOT\_CYCLE\_INDEX_s = MAX\_SLOT\_CYCLE\_INDEX_r$ )
- 4 • Home registration indicator ( $HOME\_REG_s = HOME\_REG_r$ )
- 5 • SID roamer registration indicator ( $FOR\_SID\_REG_s = FOR\_SID\_REG_r$ )
- 6 • NID roamer registration indicator ( $FOR\_NID\_REG_s = FOR\_NID\_REG_r$ )
- 7 • Power-up registration indicator ( $POWER\_UP\_REG_s = POWER\_UP\_REG_r$ )
- 8 • Power-down registration indicator ( $POWER\_DOWN\_REG_s = POWER\_DOWN\_REG_r$ )
- 9 • Parameter-change registration indicator ( $PARAMETER\_REG_s = PARAMETER\_REG_r$ )
- 10 • Registration period ( $REG\_PRD_s = REG\_PRD_r$ )
- 11 • Base station latitude ( $BASE\_LAT_s = BASE\_LAT_r$ )
- 12 • Base station longitude ( $BASE\_LONG_s = BASE\_LONG_r$ )
- 13 • Registration distance ( $REG\_DIST_s = REG\_DIST_r$ )
- 14 • Search window size for the Active Set and Candidate Set
- 15 ( $SRCH\_WIN\_A_s = SRCH\_WIN\_A_r$ )
- 16 • Search window size for the Neighbor Set ( $SRCH\_WIN\_N_s = SRCH\_WIN\_N_r$ )
- 17 • Search window size for the Remaining Set ( $SRCH\_WIN\_R_s = SRCH\_WIN\_R_r$ )
- 18 • Maximum age for retention of Neighbor Set members
- 19 ( $NGHBR\_MAX\_AGE_s = NGHBR\_MAX\_AGE_r$ )
- 20 • Power control reporting threshold ( $PWR\_REP\_THRESH_s = PWR\_REP\_THRESH_r$ )
- 21 • Power control reporting frame count ( $PWR\_REP\_FRAMES_s = PWR\_REP\_FRAMES_r$ )
- 22 • Threshold report mode indicator ( $PWR\_THRESH\_ENABLE_s =$
- 23  $PWR\_THRESH\_ENABLE_r$ )
- 24 • Periodic report mode indicator ( $PWR\_PERIOD\_ENABLE_s = PWR\_PERIOD\_ENABLE_r$ )
- 25 • Power report delay ( $PWR\_REP\_DELAY_s = PWR\_REP\_DELAY_r$ )
- 26 • Pilot detection threshold ( $T\_ADD_s = T\_ADD_r$ )
- 27 • Pilot drop threshold ( $T\_DROP_s = T\_DROP_r$ )
- 28 • Active Set versus Candidate Set comparison threshold ( $T\_COMP_s = T\_COMP_r$ )
- 29 • Drop timer value ( $T\_TDROP_s = T\_TDROP_r$ )
- 30 • *Extended System Parameters Message sent*
- 31 ( $EXT\_SYS\_PARAMETER_s = EXT\_SYS\_PARAMETER_r$ )
- 32 • *Global Service Redirection Message sent*
- 33 ( $GLOBAL\_REDIRECT_s = GLOBAL\_REDIRECT_r$ )
- 34 If  $EXT\_SYS\_PARAMETER_s$  is equal to '0', then the mobile station shall set
- 35  $EXT\_SYS\_PAR\_MSG\_SEQ_s$  to  $CONFIG\_MSG\_SEQ_s$  and shall set  $BCAST\_INDEX_s$  to
- 36  $MAX\_SLOT\_CYCLE\_INDEX_s$ .

1 If GLOBAL\_REDIRECT<sub>s</sub> is equal to '0', then the mobile station shall set GLOB\_SERV-  
2 \_REDIR\_MSG\_SEQ<sub>s</sub> to CONFIG\_MSG\_SEQ<sub>s</sub>.

3 The mobile station shall ignore any fields at the end of the *System Parameters Message*  
4 which are not defined according to the protocol revision level (MOB\_P\_REV<sub>p</sub>) being used by  
5 the mobile station.

#### 6 6.6.2.2.1.2 Paging Channel Assignment Change

7 If the number of Paging Channels specified in the *System Parameters Message*  
8 (PAGE\_CHAN<sub>r</sub>) is different from PAGE\_CHAN<sub>s</sub>, the mobile station shall use the hash  
9 algorithm specified in 6.6.7.1 to select a new Paging Channel number in the range 1 to  
10 PAGE\_CHAN<sub>r</sub>. The mobile station shall store the new Paging Channel number as  
11 PAGECH<sub>s</sub>. The mobile station shall then set PAGE\_CHAN<sub>s</sub> to PAGE\_CHAN<sub>r</sub>. The mobile  
12 station shall set ACC\_MSG\_SEQ<sub>s</sub> to NULL. If the mobile station has not stored  
13 configuration parameters for the new Paging Channel, or if the stored parameters are not  
14 current (see 6.6.2.2), the mobile station shall set CONFIG\_MSG\_SEQ<sub>s</sub>, SYS\_PAR\_MSG-  
15 \_SEQ<sub>s</sub>, NGHBR\_LST\_MSG\_SEQ<sub>s</sub>, CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and  
16 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> to NULL. The mobile station shall then begin monitoring  
17 the new Paging Channel as specified in 6.6.2.1.1.

#### 18 6.6.2.2.1.3 RESCAN Parameter

19 If the RESCAN<sub>r</sub> field in the *System Parameters Message* equals '1', the mobile station shall  
20 enter the *System Determination Substate* of the *Mobile Station Initialization State* with a  
21 rescan indication (see 6.6.1.1).

#### 22 6.6.2.2.1.4 Roaming Status

23 The mobile station shall determine the roaming status for the mobile station (see 6.6.5.3).  
24 The mobile station should indicate to the user whether the mobile station is roaming.

#### 25 6.6.2.2.1.5 Registration

26 The mobile station shall update stored variables and perform other registration procedures  
27 as specified in 6.6.5.5.2.2.

#### 28 6.6.2.2.1.6 Slot Cycle Index

29 The mobile station shall set SLOT\_CYCLE\_INDEX<sub>s</sub> to the smaller of: the preferred slot cycle  
30 index SLOT\_CYCLE\_INDEX<sub>p</sub> and the maximum slot cycle index  
31 MAX\_SLOT\_CYCLE\_INDEX<sub>s</sub>. If the mobile station is operating in the slotted mode, it shall  
32 set its slot cycle length as described in 6.6.2.1.1.3.

#### 33 6.6.2.2.2 Access Parameters Message

34 Whenever an *Access Parameters Message* is received on the Paging Channel, the sequence  
35 number, ACC\_MSG\_SEQ<sub>r</sub>, shall be compared to ACC\_MSG\_SEQ<sub>s</sub>. If the comparison  
36 results in a match, the mobile station may ignore the message. If the comparison results in  
37 a mismatch, then the mobile station shall process the remaining fields in the message as  
38 follows.

1 If PROBE\_PN\_RAN, MAX\_REQ\_SEQ, or MAX\_RSP\_SEQ are not within the valid ranges  
 2 specified in 7.7.2.3.2.2, then the mobile station shall ignore the *Access Parameters Message*  
 3 that contains them.

4 The mobile station shall store the following parameters:

- 5 • *Access Parameters Message* sequence number ( $ACC\_MSG\_SEQ_s = ACC\_MSG\_SEQ_r$ )
- 6 • Number of Access Channels ( $ACC\_CHAN_s = ACC\_CHAN_r$ )
- 7 • Nominal transmit power offset ( $NOM\_PWR_s = NOM\_PWR_r$ )
- 8 • Initial power offset for access ( $INIT\_PWR_s = INIT\_PWR_r$ )
- 9 • Power increment ( $PWR\_STEP_s = PWR\_STEP_r$ )
- 10 • Number of access probes ( $NUM\_STEP_s = NUM\_STEP_r$ )
- 11 • Maximum Access Channel message capsule size ( $MAX\_CAP\_SZ_s = MAX\_CAP\_SZ_r$ )
- 12 • Access Channel preamble length ( $PAM\_SZ_s = PAM\_SZ_r$ )
- 13 • Persistence modifier for Access Channel attempts for registrations which are not  
 14 responses to the *Registration Request Order* ( $REG\_PSIST_s = REG\_PSIST_r$ )
- 15 • Persistence modifier for Access Channel attempts for message transmissions  
 16 ( $MSG\_PSIST_s = MSG\_PSIST_r$ )
- 17 • Time randomization for Access Channel probes ( $PROBE\_PN\_RAN_s = PROBE\_PN\_RAN_r$ )
- 18 • Acknowledgement timeout ( $ACC\_TMO_s = ACC\_TMO_r$ )
- 19 • Access Channel probe backoff range ( $PROBE\_BKOFF_s = PROBE\_BKOFF_r$ )
- 20 • Access Channel probe sequence backoff range ( $BKOFF_s = BKOFF_r$ )
- 21 • Maximum number of probe sequences for an Access Channel request  
 22 ( $MAX\_REQ\_SEQ_s = MAX\_REQ\_SEQ_r$ )
- 23 • Maximum number of probe sequences for an Access Channel response  
 24 ( $MAX\_RSP\_SEQ_s = MAX\_RSP\_SEQ_r$ )
- 25 • Authentication mode (if  $AUTH_r$  is equal to '00' or '01', then  $AUTH_s = AUTH_r$ ,  
 26 otherwise  $AUTH_s = '01'$ )
- 27 • Random challenge value ( $RAND_s = RAND_r$ )

28 The mobile station shall ignore any fields at the end of the *Access Parameters Message*  
 29 which are not defined according to the protocol revision level ( $MOB\_P\_REV_p$ ) being used by  
 30 the mobile station.

31 The mobile station shall store the persistence parameter number that corresponds to the  
 32 mobile station's access overload class ( $PSIST_s = PSIST_r$ ).

### 33 6.6.2.2.3 Neighbor List Message

34 Whenever a valid *Neighbor List Message* is received on the current Paging Channel  
 35 ( $PAGECH_s$ ), the configuration message sequence number,  $CONFIG\_MSG\_SEQ_r$ , shall be  
 36 compared to that stored in  $NGHBR\_LST\_MSG\_SEQ_s$ . If the comparison results in a match,

- 1 the mobile station may ignore the message. If the comparison results in a mismatch, then  
 2 the mobile station shall process the remaining fields in the message as follows.
- 3 If the PILOT\_INC field is not within the valid range specified in 7.7.2.3.2.3, then the mobile  
 4 station shall ignore the *Neighbor List Message* that contains it.

5 The mobile station shall store the following parameters:

- 6 • Configuration message sequence number  
 7 (CONFIG\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>;  
 8 NGHBR\_LST\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>)
- 9 • Pilot PN sequence offset increment (PILOT\_INC<sub>s</sub> = PILOT\_INC<sub>r</sub>)

10 For each of the neighboring base stations contained in the *Neighbor List Message*, the  
 11 mobile station shall store the following:

- 12 • Neighbor configuration (if NGHBR\_CONFIG<sub>r</sub> is equal to '000', '001', or '010', then  
 13 NGHBR\_CONFIG<sub>s</sub> = NGHBR\_CONFIG<sub>r</sub>, otherwise, NGHBR\_CONFIG<sub>s</sub> = '011')
- 14 • Neighbor pilot PN sequence offset (NGHBR\_PN<sub>s</sub> = NGHBR\_PN<sub>r</sub>)

15 The mobile station shall update the idle handoff Neighbor Set (see 6.6.2.1.4) so that it  
 16 consists only of pilot offsets listed in the *Neighbor List Message*. If the *Neighbor List*  
 17 *Message* contains more pilot offsets than the mobile station can store, the mobile station  
 18 shall store the pilot offsets beginning at the start of the *Neighbor List Message*, up to the  
 19 limits of the mobile station's Neighbor Set storage capacity.

#### 20 6.6.2.2.4 CDMA Channel List Message

21 Whenever a *CDMA Channel List Message* is received on the Paging Channel, the  
 22 configuration message sequence number, CONFIG\_MSG\_SEQ<sub>r</sub>, shall be compared to that  
 23 stored in CHAN\_LST\_MSG\_SEQ<sub>s</sub>. If the comparison results in a match, the mobile station  
 24 may ignore the message. If the comparison results in a mismatch, then the mobile station  
 25 shall process the remaining fields in the message as follows.

26 The mobile station shall store the following parameters:

- 27 • Configuration message sequence number  
 28 (CONFIG\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>;  
 29 CHAN\_LST\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>)

30 The mobile station shall use the hash algorithm specified in 6.6.7.1 and the number of  
 31 channels listed in the *CDMA Channel List Message* to determine the CDMA Channel  
 32 (frequency assignment) for its Paging Channel. If the CDMA frequency assignment has  
 33 changed (the computed CDMA Channel is different from CDMACH<sub>s</sub>), the mobile station  
 34 shall perform the following actions:

- 35 • Set CDMACH<sub>s</sub> to the new CDMA Channel.
- 36 • Set PAGE\_CHAN<sub>s</sub> to '1'.
- 37 • Set PAGECH<sub>s</sub> to the Primary Paging Channel.

- 1 • Set CONFIG\_MSG\_SEQ<sub>s</sub>, SYS\_PAR\_MSG\_SEQ<sub>s</sub>, NGHBR\_LST\_MSG\_SEQ<sub>s</sub>,  
 2 CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>,  
 3 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub>, and ACC\_MSG\_SEQ<sub>s</sub> to NULL.
- 4 • Tune to the new CDMA Channel.

#### 6 6.6.2.2.5 Extended System Parameters Message

6 Whenever an *Extended System Parameters Message* is received on the Paging Channel, the  
 7 configuration message sequence number, CONFIG\_MSG\_SEQ<sub>r</sub>, shall be compared to that  
 8 stored in EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>. If the comparison results in a match, the mobile  
 9 station may ignore the message. If the comparison results in a mismatch, then the mobile  
 10 station shall process the remaining fields in the message as follows.

11 The mobile station shall store the following parameters:

- 12 • Configuration message sequence number  
 13 (CONFIG\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>.)  
 14 EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>)
- 15 • Preferred Access Channel MSID Type (PREF\_MSID\_TYPE<sub>s</sub> = PREF\_MSID\_TYPE<sub>r</sub>)
- 16 • Broadcast slot cycle index (BCAST\_INDEX<sub>s</sub> = BCAST\_INDEX<sub>r</sub>)
- 17 • Mobile country code (MCC<sub>s</sub> = MCC<sub>r</sub>)
- 18 • IMSI 11th and 12th Digits (IMSI\_11\_12<sub>s</sub> = IMSI\_11\_12<sub>r</sub>)

#### 19 6.6.2.2.6 Global Service Redirection Message

20 Whenever a *Global Service Redirection Message* is received on the Paging Channel, the  
 21 configuration message sequence number, CONFIG\_MSG\_SEQ<sub>r</sub>, shall be compared to that  
 22 stored in GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub>. If the comparison results in a match, the  
 23 mobile station may ignore the message. If the comparison results in a mismatch, the  
 24 mobile station shall store the following parameters:

- 25 • Configuration message sequence number  
 26 (CONFIG\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>.)  
 27 GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> = CONFIG\_MSG\_SEQ<sub>r</sub>)

28 If the subfield corresponding to the access overload class, ACCOLC<sub>p</sub>, of the mobile station  
 29 is set equal to '1' in the REDIRECT\_ACCOLC<sub>r</sub> field of the received message, the mobile  
 30 station shall store the following parameters and then shall enter the *System Determination*  
 31 *Substate* of the *Mobile Station Initialization State* with a redirection indication (see 6.6.1.1):

- 32 • Return if fail indicator (RETURN\_IF\_FAIL<sub>s</sub> = RETURN\_IF\_FAIL<sub>r</sub>)
- 33 • Redirection record (REDIRECT\_REC<sub>s</sub> = redirection record from received message)

#### 34 6.6.2.3 Mobile Station Page Match Operation

35 The page messages on the Paging Channel are:

- 36 • *Page Message*
- 37 • *Slotted Page Message*



1       • *General Page Message*

2       The *Mobile Station Page Match Operation* is performed whenever the mobile station receives  
3       a page message. The mobile station searches each message to determine whether it  
4       contains the mobile station's IMSI. If so, the mobile station transmits a *Page Response*  
5       *Message* to the page message on the Access Channel. If configured to receive broadcast  
6       messages, the mobile station also searches each *Data Burst Message* to determine whether  
7       it contains a burst type and broadcast address that the mobile station has been configured  
8       to receive. If so, the mobile station performs the broadcast page procedures described in  
9       2.4.1.2.2 of TIA/EIA/IS-637.

10       The mobile station shall compare the configuration message sequence number, CONFIG-  
11       MSG\_SEQ<sub>r</sub>, to CONFIG\_MSG\_SEQ<sub>s</sub>. If the comparison results in a mismatch, then the  
12       mobile station shall set CONFIG\_MSG\_SEQ<sub>s</sub> to CONFIG\_MSG\_SEQ<sub>r</sub>. The mobile station  
13       shall also compare the *Access Parameters Message* sequence number, ACC\_MSG\_SEQ<sub>r</sub>,  
14       with that stored in ACC\_MSG\_SEQ<sub>s</sub>. If the comparison results in a mismatch, then the  
15       mobile station shall set ACC\_MSG\_SEQ<sub>s</sub> to NULL (see 6.6.2.2).

16       The mobile station shall use the following procedures when processing a record in the  
17       *Slotted Page Message* and the *Page Message*:

- 18       • The mobile station shall compare its IMSI with the MIN in each record of the page  
19       message (see 7.7.2.3.2.5 and 7.7.2.3.2.6). If both MIN1 and MIN2 are present in a  
20       record and both MIN1 and MIN2 match IMSI\_S1 and IMSI\_S2 for the mobile station,  
21       then the mobile station shall declare a page match. If MIN1 but not MIN2 is present  
22       in a record, MIN1 matches IMSI\_S1 for the mobile station, and a home (non-roaming)  
23       (SID, NID) pair matches the SID and NID of the base station, then the mobile station  
24       shall declare a page match (see 6.6.5.3). Any other combination shall be considered  
25       a mismatch.

26       The mobile station shall process the records in the *General Page Message* in the order they  
27       occur using the following procedures:

- 28       • The mobile station shall ignore all remaining bits in the message if a page record has:  
29       - PAGE\_CLASS equal to '01' and PAGE\_SUBCLASS equal to '10' or '11'.  
30       - PAGE\_CLASS equal to '10', or  
31       - PAGE\_CLASS equal to '11' and PAGE\_SUBCLASS equal to '01', '10', or '11'.  
32       • If PAGE CLASS is equal to '00' and PAGE SUBCLASS is equal to '00', the mobile  
33       station shall process the record and declare a page match if all the following  
34       conditions are met:  
35       - The mobile station has been assigned a class 0 IMSI (see 6.3.1),  
36       - IMSI\_S<sub>p</sub> is equal to the IMSI\_S received in the page record,  
37       - IMSI\_11\_12<sub>p</sub> is equal to IMSI\_11\_12<sub>s</sub>,  
38       - MCC<sub>p</sub> is equal to MCC<sub>s</sub>.

- 1       • If PAGE\_CLASS is equal to '00' and PAGE\_SUBCLASS is equal to '01', the mobile  
2       station shall process the record and declare a page match if all the following  
3       conditions are met:
- 4           - The mobile station has been assigned a class 0 IMSI,  
5           - IMSI<sub>S<sub>p</sub></sub> is equal to the IMSI<sub>S</sub> received in the page record,  
6           - IMSI<sub>11\_12<sub>p</sub></sub> is equal to the IMSI<sub>11\_12</sub> received in the page record, and  
7           - MCC<sub>p</sub> is equal to MCC<sub>s</sub>.
- 8       • If PAGE\_CLASS is equal to '00' and PAGE\_SUBCLASS is equal to '10', the mobile  
9       station shall process the record and declare a page match if all the following  
10       conditions are met:
- 11           - The mobile station has been assigned a class 0 IMSI,  
12           - IMSI<sub>S<sub>p</sub></sub> is equal to the IMSI<sub>S</sub> received in the page record,  
13           - IMSI<sub>11\_12<sub>p</sub></sub> is equal to IMSI<sub>11\_12<sub>s</sub></sub>, and  
14           - MCC<sub>p</sub> is equal to the MCC received in the page record.
- 15       • If PAGE\_CLASS is equal to '00' and PAGE\_SUBCLASS is equal to '11', the mobile  
16       station shall process the record and declare a page match if all the following  
17       conditions are met:
- 18           - The mobile station has been assigned a class 0 IMSI,  
19           - IMSI<sub>S<sub>p</sub></sub> is equal to the IMSI<sub>S</sub> received in the page record,  
20           - IMSI<sub>11\_12<sub>p</sub></sub> is equal to the IMSI<sub>11\_12</sub> received in the page record, and  
21           - MCC<sub>p</sub> is equal to the MCC received in the page record.
- 22       • If PAGE\_CLASS is equal to '01' and PAGE\_SUBCLASS is equal to '00', the mobile  
23       station shall process the record and declare a page match if all the following  
24       conditions are met:
- 25           - The mobile station has been assigned a class 1 IMSI (see 6.3.1),  
26           - IMSI<sub>S<sub>p</sub></sub> is equal to the IMSI<sub>S</sub> received in the page record,  
27           - IMSI<sub>11\_12<sub>p</sub></sub> is equal to the IMSI<sub>11\_12</sub> received in the page record,  
28           - MCC<sub>p</sub> is equal to MCC<sub>s</sub>, and  
29           - IMSI\_ADDR\_NUM<sub>p</sub> is equal to the IMSI\_ADDR\_NUM received in the page record.
- 30       • If PAGE\_CLASS is equal to '01' and PAGE\_SUBCLASS is equal to '01', the mobile  
31       station shall process the record and declare a page match if all the following  
32       conditions are met:
- 33           - The mobile station has been assigned a class 1 IMSI,  
34           - IMSI<sub>S<sub>p</sub></sub> is equal to the IMSI<sub>S</sub> received in the page record,  
35           - IMSI<sub>11\_12<sub>p</sub></sub> is equal to the IMSI<sub>11\_12</sub> received in the page record,

- 1       -  $MCC_p$  is equal to the MCC received in the page record, and
- 2       -  $IMSI\_ADDR\_NUM_p$  is equal to the  $IMSI\_ADDR\_NUM$  received in the page record.
- 3       • If the mobile station is configured to receive broadcast messages, then for each
- 4       record of the page message with  $PAGE\_CLASS$  equal to '11' and  $PAGE\_SUBCLASS$
- 5       equal to '00', the mobile station shall compare the  $BURST\_TYPE$  and  $BC\_ADDR$  fields
- 6       to the burst types and broadcast addresses that the mobile station has been
- 7       configured to receive. If the record contains a burst type and broadcast address that
- 8       the mobile station has been configured to receive, the mobile station should perform
- 9       the broadcast page procedures described in 2.4.1.2.2 of TIA/EIA/IS-637. The mobile
- 10       station shall not declare a page match for a page record with  $PAGE\_CLASS$  equal to
- 11       '11' and  $PAGE\_SUBCLASS$  equal to '00'.

12 If a page match is declared, the mobile station shall enter the *Update Overhead Information*  
 13 *Substate* of the *System Access State* (see 6.6.3.2) with a page response indication within  
 14  $T_{33m}$  seconds after the page message is received.

#### 15 6.6.2.4 Mobile Station Order and Message Processing Operation

16 During the *Mobile Station Order and Message Processing Operation*, the mobile station  
 17 processes all messages except overhead messages (see 6.6.2.2) and page messages (see  
 18 6.6.2.3).

19 The mobile station shall perform address matching as described in 6.6.2.1.5. If an address  
 20 match is declared, the mobile station shall process the message; otherwise, the mobile  
 21 station shall ignore the message.

22 The following cases occur for messages received on the Paging Channel whose **ADDRESS**  
 23 field matches the mobile station's identification data:

- 24       • If the message is a *Data Burst Message* that is addressed to a broadcast address the  
 25       mobile station has been configured to receive, the mobile station shall process the  
 26       message but shall not acknowledge the message nor return an error message.
- 27       • If the message requires acknowledgement, and is not the *Lock Until Power-Cycled*  
 28       *Order* or the *Unlock Order*, the mobile station shall acknowledge the message as  
 29       specified in 6.6.2.1.2. The mobile station shall enter the *Update Overhead*  
 30       *Information Substate* of the *System Access State* with an order/message response  
 31       indication within  $T_{33m}$  seconds, unless otherwise specified for a particular message.
- 32       • If the message does not require acknowledgement, the mobile station shall transmit a  
 33       response only if it is required by the message or order. If a response is required, the  
 34       mobile station shall enter the *Update Overhead Information Substate* of the *System*  
 35       *Access State* with an order/message response indication within  $T_{33m}$  seconds, unless  
 36       otherwise specified for a particular message.

37 The following directed messages and orders can be received. If any field value of the  
 38 message is outside its permissible range, the mobile station may send a *Mobile Station*  
 39 *Reject Order* with **ORDQ** equal to '00000100' (message field not in valid range).

- 40 1. *Abbreviated Alert Order*: The mobile station may alert the user.

2. Audit Order

3. Authentication Challenge Message: The mobile station shall process the message and shall respond with an *Authentication Challenge Response Message* as specified in 6.3.12.1.5, regardless of the value of  $AUTH_s$ . The mobile station shall enter the *Update Overhead Information Substate* of the *System Access State* with an order/message response indication within  $T_{32m}$  seconds.

4. Base Station Acknowledgement Order

5. Base Station Challenge Confirmation Order: The mobile station shall process the message and shall respond with an *SSD Update Confirmation Order* or *SSD Update Rejection Order* as specified in 6.3.12.1.9. The mobile station shall enter the *Update Overhead Information Substate* of the *System Access State* with an order/message response indication within  $T_{32m}$  seconds.

6. Channel Assignment Message: If the message specifies a Paging Channel assignment ( $ASSIGN\_MODE$  equal to '001'), the mobile station shall perform the following actions: If a CDMA channel ( $CDMA\_FREQ$ ) is specified in the assignment, the mobile station shall set  $CDMACH_s = CDMA\_FREQ_r$ , tune to the new frequency assignment, and measure the strength of each pilot listed in the assignment using the Neighbor Set search procedures specified in 6.6.6.2.1 and 6.6.6.2.2. The mobile station shall set  $ACC\_MSG\_SEQ_s$  to NULL (see 6.6.2.2) and shall set  $PILOT\_PN_s$  to the pilot PN sequence offset of the strongest pilot in the list ( $PILOT\_PN_r$ ). If the mobile station has not stored configuration parameters for the Primary Paging Channel of the new base station, or if the stored information is not current (see 6.6.2.2), the mobile station shall set  $CONFIG\_MSG\_SEQ_s$ ,  $SYS\_PAR\_MSG\_SEQ_s$ ,  $NGHBR\_LST\_MSG\_SEQ_s$ ,  $CHAN\_LST\_MSG\_SEQ_s$ ,  $EXT\_SYS\_PAR\_MSG\_SEQ_s$ , and  $GLOB\_SERV\_REDIR\_MSG\_SEQ_s$  to NULL. The mobile station shall set  $PAGE\_CHAN_s$  to '1' and  $PAGECH_s$  to the Primary Paging Channel. The mobile station shall then begin monitoring the Primary Paging Channel of the selected base station.

If the  $ASSIGN\_MODE$  field is any value other than '001', the mobile station shall respond with a *Mobile Station Reject Order* with  $ORDQ$  equal to '00000010' (message not accepted in this state).

7. Data Burst Message8. Feature Notification Message9. Local Control Order

10. Lock Until Power-Cycled Order: The mobile station shall record the reason for the *Lock Until Power-Cycled Order* in the mobile station's semi-permanent memory ( $LCKRSN\_P_{s-p}$  equals the least significant four bits of  $ORDQ_r$ ). After a mobile station receives this order, it shall not enter the *System Access State* (see 6.6.3) until it has received an *Unlock Order* or until after power-cycling the mobile station (i.e., after the next mobile station power-up). This requirement shall take precedence over any other mobile station requirement specifying entry to the *System Access State*. The mobile station should notify the user of the locked condition. The mobile station may

- 1        exit the *Mobile Station Idle State* and enter the *System Determination Substate* of the
- 2        *Mobile Station Initialization State* with a lock indication (see 6.6.1.1). This allows the
- 3        mobile station to operate in the analog mode while locked.
- 4        11. *Maintenance Required Order*: The mobile station shall record the reason for the
- 5        *Maintenance Required Order* in the mobile station's semi-permanent memory
- 6        (MAINTRSN<sub>s-p</sub> equals the least significant four bits of ORDQ<sub>r</sub>). If the mobile
- 7        station has previously received a *Lock Until Power-Cycled Order*, it shall remain in
- 8        the locked condition; otherwise the mobile station shall remain in the unlocked
- 9        condition. The mobile station should notify the user of the maintenance required
- 10       condition.
- 11       12. *Registration Accepted Order*
- 12       13. *Registration Rejected Order*: This order indicates that normal service is not
- 13       available on this system. The mobile station shall enter the *System Determination*
- 14       *Substate* with a registration rejected indication.
- 15       14. *Registration Request Order*: The mobile station shall process the message and
- 16       perform registration procedures as specified in 6.6.5.5.2.3.
- 17       15. *Service Redirection Message*: The mobile station shall set RETURN\_IF\_FAIL<sub>s</sub> =
- 18       RETURN\_IF\_FAIL<sub>r</sub>, and shall set REDIRECT\_REC<sub>s</sub> = the redirection record from the
- 19       received message. The mobile station shall enter the *System Determination*
- 20       *Substate* of the *Mobile Station Initialization State* with a redirection indication (see
- 21       6.6.1.1).
- 22       16. *SSD Update Message*: The mobile station shall process the message and shall
- 23       respond with a *Base Station Challenge Order* as specified in 6.3.12.1.9. The mobile
- 24       station shall enter the *Update Overhead Information Substate* of the *System Access*
- 25       *State* with an order/message response indication within T<sub>32m</sub> seconds.
- 26       17. *Unlock Order*: After receiving this order, the mobile station is no longer locked. The
- 27       mobile station should notify the user that the locked condition has been removed.
- 28       The mobile station shall enter the *System Determination Substate* of the *Mobile*
- 29       *Station Initialization State* with an unlock indication (see 6.6.1.1).

30       The mobile station shall ignore all other messages and orders.

#### 31       6.6.2.5 Mobile Station Origination Operation

32       The *Mobile Station Origination Operation* is performed when the mobile station is directed by

33       the user to initiate a call.

34       The mobile station shall enter the *Update Overhead Information Substate* of the *System*

35       *Access State* (see 6.6.3) with an origination indication within T<sub>33m</sub> seconds.

#### 36       6.6.2.6 Mobile Station Message Transmission Operation

37       Support of this operation is optional. If the mobile station supports the *Mobile Station*

38       *Message Transmission Operation*, the operation is performed when the user directs the

39       mobile station to transmit a *Data Burst Message*.

1 If the mobile station supports this operation, the mobile station shall enter the *Update*  
2 *Overhead Information Substate* of the *System Access State* (see 6.6.3.2) with a message  
3 transmission indication within  $T_{33m}$  seconds.

#### 4 6.6.2.7 Mobile Station Power-Down Operation

5 The *Mobile Station Power-Down Operation* is performed when the user directs the mobile  
6 station to power down.

7 The mobile station shall update stored parameters and perform other registration  
8 procedures as specified in 6.6.5.2.4.

9 If no power-down registration is performed (see 6.6.5.2.4), the mobile station may power  
10 down.

#### 11 6.6.3 System Access State

12 In this state, the mobile station sends messages to the base station on the Access  
13 Channel(s) and receives messages from the base station on the Paging Channel.

14 As illustrated in Figure 6.6.3-1, the System Access State consists of the following substates:

- 15 • *Update Overhead Information Substate* - In this substate, the mobile station monitors  
16 the Paging Channel until it has a current set of overhead messages.
- 17 • *Mobile Station Origination Attempt Substate* - In this substate, the mobile station  
18 sends an *Origination Message* to the base station.
- 19 • *Page Response Substate* - In this substate, the mobile station sends a *Page Response*  
20 *Message* to the base station.
- 21 • *Mobile Station Order/Message Response Substate* - In this substate, the mobile  
22 station sends a response to a message received from the base station.
- 23 • *Registration Access Substate* - In this substate, the mobile station sends a  
24 *Registration Message* to the base station.
- 25 • *Mobile Station Message Transmission Substate* - In this substate, the mobile station  
26 sends a *Data Burst Message* to the base station.

27

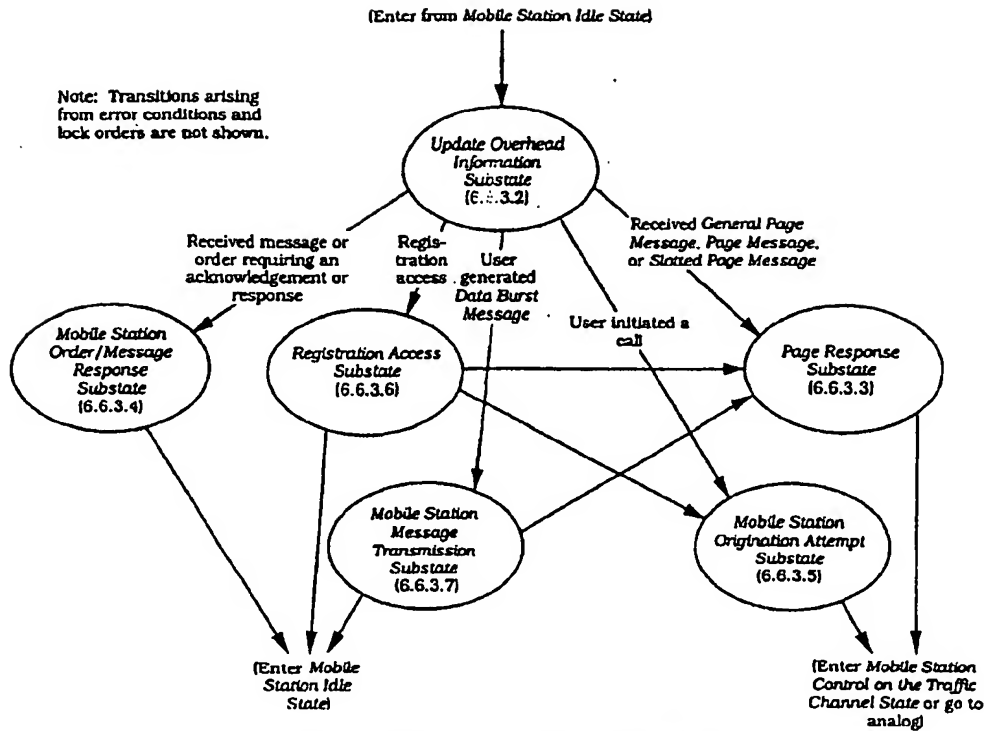


Figure 6.6.3-1. System Access State

## 6.6.3.1 Access Procedures

## 6.6.3.1.1 Access Attempts

## 6.6.3.1.1.1 Overview

The mobile station transmits on the Access Channel using a random access procedure. Many parameters of the random access procedure are supplied by the base station in the *Access Parameters Message*.

The entire process of sending one message and receiving (or failing to receive) an acknowledgement for that message is called an access attempt (see Figure 6.6.3.1.1.1-1 and the example in Figure 6.6.3.1.1.1-2). Each transmission in the access attempt is called an access probe. The mobile station transmits the same message in each access probe in an access attempt. Each access probe consists of an Access Channel preamble and an Access Channel message capsule (see Figure 6.6.3.1.1.1-1B).

Within an access attempt, access probes are grouped into access probe sequences. Each access probe sequence consists of up to  $1 + \text{NUM\_STEP}$  access probes, all transmitted on the same Access Channel. The Access Channel used for each access probe sequence is chosen pseudorandomly from among all the Access Channels associated with the current Paging Channel. The first access probe of each access probe sequence is transmitted at a specified power level relative to the nominal open loop power level. Each subsequent access

- 1 probe is transmitted at a power level that is a specified amount higher than the previous  
2 access probe (see 6.1.2.3.1).
- 3 The timing of access probes and access probe sequences is expressed in terms of Access  
4 Channel slots (see 6.7.1.1). The transmission of an access probe begins at the start of an  
5 Access Channel Slot.
- 6 There are two types of messages sent on the Access Channel: a response message (one that  
7 is a response to a base station message) or a request message (one that is sent  
8 autonomously by the mobile station). Different procedures are used for sending a response  
9 message and for sending a request message. The timing of the start of each access probe  
10 sequence is determined pseudorandomly. For every access probe sequence, a backoff  
11 delay, RS, from 0 to  $1 + \text{BKOFF}$  slots is generated pseudorandomly. For request access  
12 probe sequences only, an additional delay is imposed by the use of a persistence test that  
13 determines the value of the Persistence Delay, PD.<sup>15</sup> For each slot after the backoff delay,  
14 RS, the mobile station performs a pseudorandom test, with parameters that depend on the  
15 reason for the access attempt and the access overload class,  $\text{ACCOLC}_p$ , of the mobile  
16 station. If the test passes, the first access probe of the sequence begins in that slot. If the  
17 test fails, the access probe sequence is deferred until at least the next slot.
- 18 Timing between access probes of an access probe sequence is also generated  
19 pseudorandomly. After transmitting each access probe, the mobile station waits a specified  
20 period,  $\text{TA} = (2 + \text{ACC\_TMO}) \times 80$  ms, from the end of the slot to receive an  
21 acknowledgement from the base station. If an acknowledgement is received, the access  
22 attempt ends. If no acknowledgement is received, the next access probe is transmitted after  
23 an additional backoff delay, RT, from 0 to  $1 + \text{PROBE\_BKOFF}$  slots.
- 24 The precise timing of the Access Channel transmissions in an access attempt is determined  
25 by a procedure called PN randomization. For each access attempt, the mobile station  
26 computes a delay, RN, from 0 to  $2^{\text{PROBE\_PN\_RAN}} - 1$  PN chips using a (non-random) hash  
27 function that depends on its ESN. The mobile station delays its transmit timing by RN  
28 PN chips. This transmit timing adjustment includes delay of the direct sequence spreading  
29 long code and of the quadrature spreading I and Q pilot PN sequences, so it effectively  
30 increases the apparent range from the mobile station to the base station.<sup>16</sup>

---

<sup>15</sup>A persistence test is not needed for response access attempts, because the base station controls the arrival rate of response messages directly by controlling the rate at which it transmits messages requiring responses.

<sup>16</sup>This increases the probability that the base station will be able to separately demodulate transmissions from multiple mobile stations in the same Access Channel slot, especially when many mobile stations are at a similar range from the base station. Use of a non-random algorithm for PN randomization permits the base station to separate the PN randomization from the actual propagation delay from the mobile station, so it can accurately estimate the timing of Reverse Traffic Channel transmissions from the mobile station.



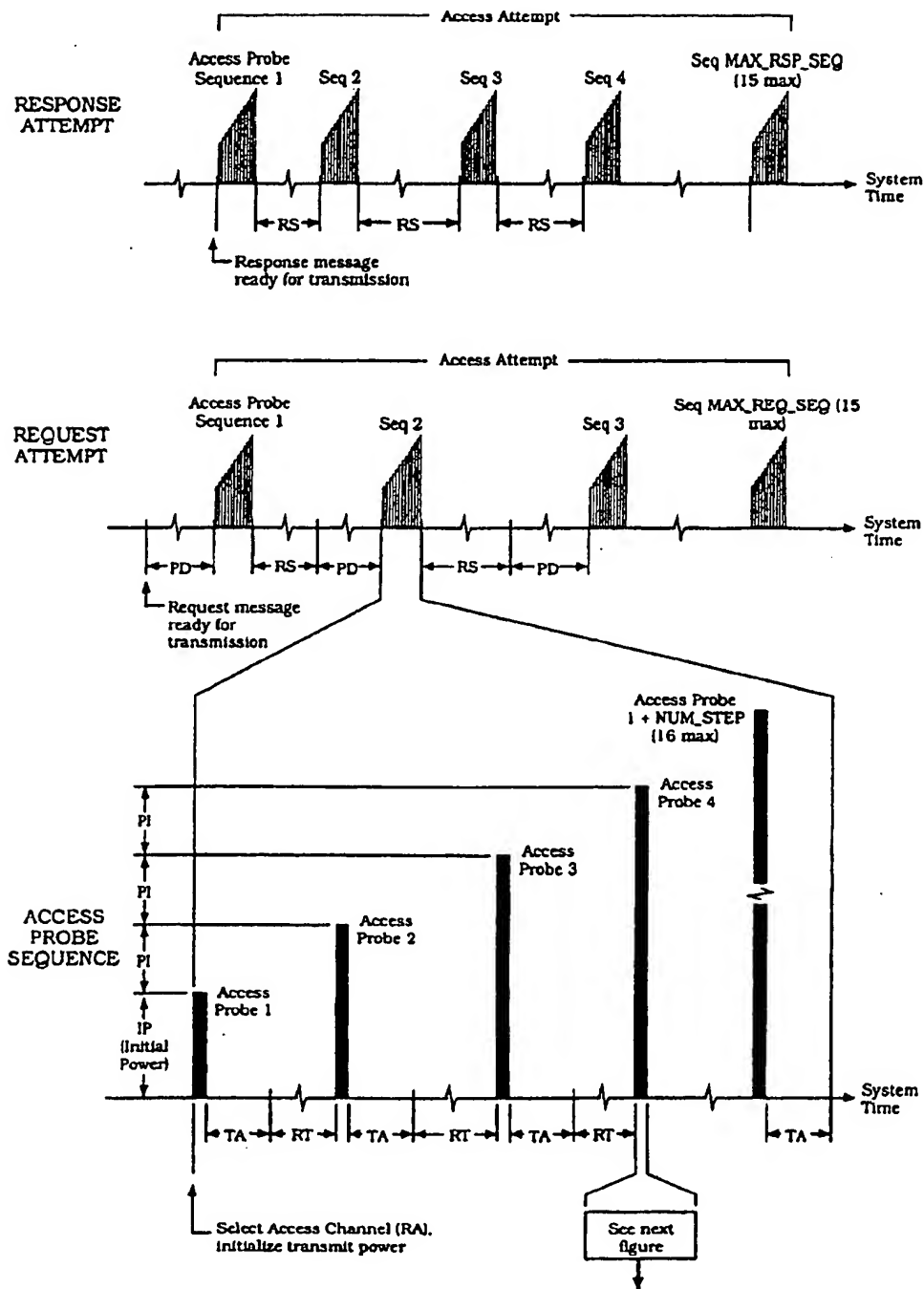
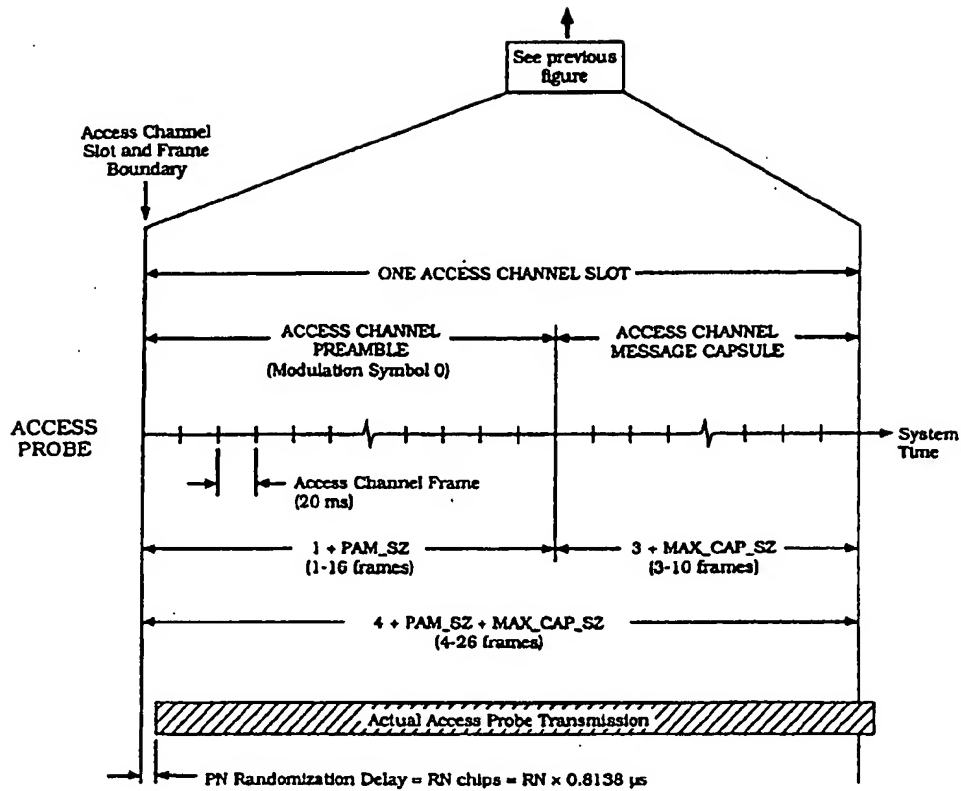


Figure 6.6.3.1.1.1-1A. Access Channel Request and Response Attempts



Calculated, Random, and Hashed Variables

Variable	Name	Generation	Range	Units
IP	Initial Open-Loop Power	$IP = -73 - \text{Mean Input Power (dBm)} + \text{NOM\_PWR} + \text{INIT\_PWR}$	See 6.1.2.1 6.1.2.2.1	dBm
PD	Persistence Delay	Delay continues slot-by-slot until persistence test (run every slot) passes.	—	slots
PI	Power Increment	$PI = \text{PWR\_STEP}$	0 to 7	dB
RA	Access Channel Number	Random between 0 and ACC_CHAN; generated before every sequence.	0 to 31	—
RN	PN Randomization Delay	Hash using ESN between 0 and $2 \text{ PROBE\_PN\_RAN} - 1$ ; generated once at beginning of attempt.	0 to 511	chips
RS	Sequence Backoff	Random between 0 and $1 + \text{BKOFF}$ ; generated before every sequence (except the first sequence).	0 to 16	slots
RT	Probe Backoff	Random between 0 and $1 + \text{PROBE\_BKOFF}$ ; generated before subsequent probes.	0 to 16	slots
TA	Ack Response Timeout	$TA = 80 \times (2 + \text{ACC\_TMO})$ ; timeout from end of slot	160 to 1360	ms

Figure 6.6.3.1.1.1-B. Access Channel Request and Response Attempts

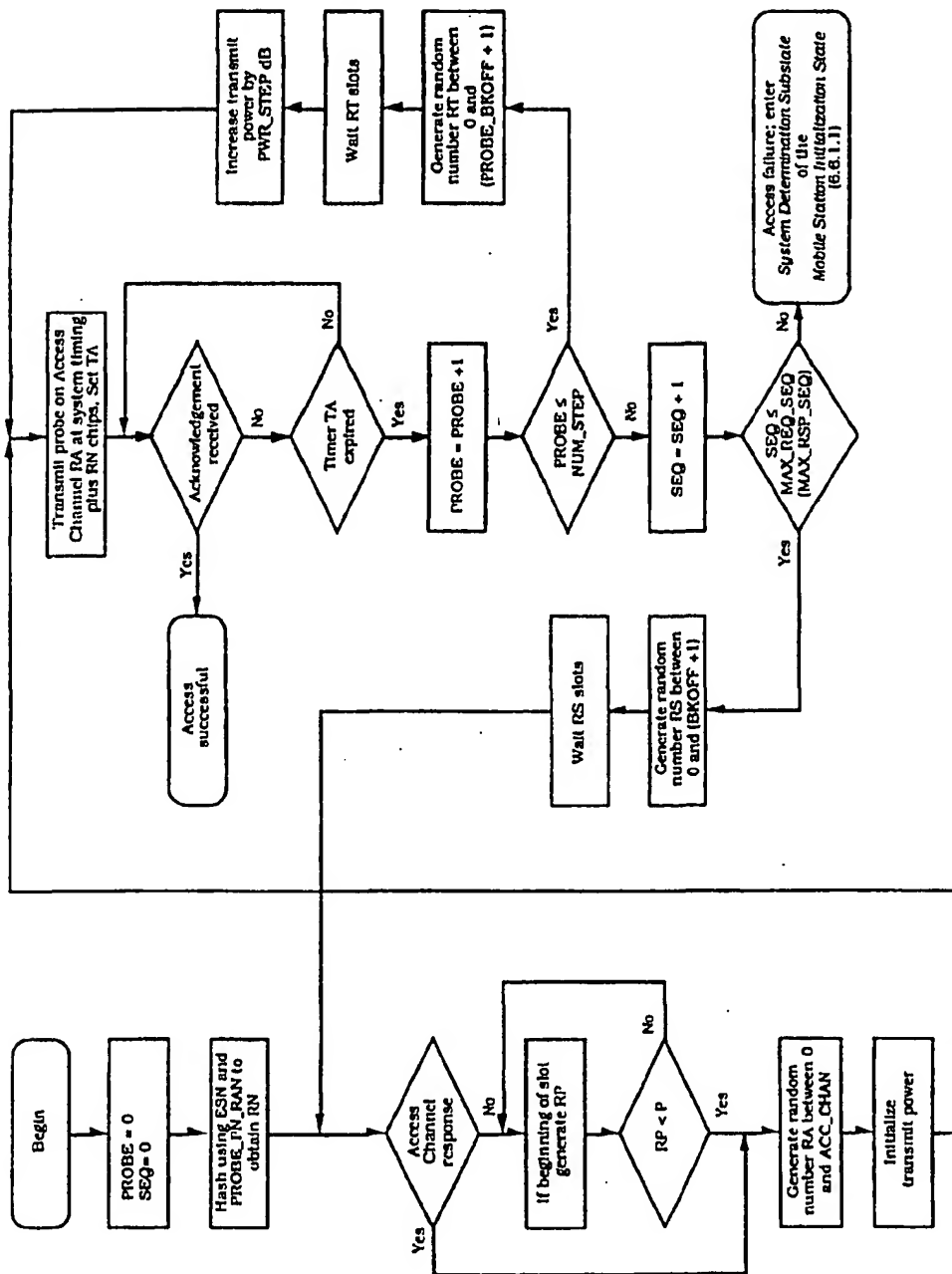


Figure 6.6.3.1.1.1-2. Access Procedure Example

1 6.6.3.1.1.2 Requirements

2 Each time the mobile station performs an access attempt, it shall compute a number, RN,  
3 from 0 to  $2^{\text{PROBE\_PN\_RAN}} - 1$ , using the hashing technique described in 6.6.7.1. For the  
4 duration of this access attempt, the mobile station shall delay its transmit timing (see  
5 6.1.3.2.1), including long code direct sequence spreading (see 6.1.3.2.8) and I and Q pilot  
6 PN sequence quadrature spreading (see 6.1.3.2.9), by RN PN chips.

7 When the mobile station performs an access attempt, it shall transmit one or more access  
8 probe sequences. If the access attempt is an Access Channel request, the mobile station  
9 shall transmit no more than  $\text{MAX\_REQ\_SEQ}_s$  access probe sequences; if the access  
10 attempt is an Access Channel response, the mobile station shall transmit no more than  
11  $\text{MAX\_RSP\_SEQ}_s$  access probe sequences.

12 Before transmitting each access probe sequence, the mobile station shall generate a  
13 random number, RA, from 0 to  $\text{ACC\_CHAN}_s$  using the procedure described in 6.6.7.2. The  
14 mobile station shall use this random number, RA, as the Access Channel number, ACN, in  
15 the Access Channel long code mask for all access probes in that access probe sequence (see  
16 6.1.3.1.8).

17 Before transmitting each access probe sequence other than the first access probe sequence,  
18 the mobile station shall generate a random number, RS, from 0 to  $(\text{BKOFF}_s + 1)$ , using the  
19 procedure described in 6.6.7.2. The mobile station shall delay the transmission of the  
20 access probe sequence for RS slots.

21 If the access attempt is an Access Channel request, then before transmitting the first  
22 access probe in each access probe sequence, and after the delay of RS if applicable, the  
23 mobile station shall perform a persistence test for each Access Channel slot. The mobile  
24 station shall transmit the first access probe of a probe sequence in a slot only if the test  
25 passes for that slot. To perform the persistence test, the mobile station shall generate a  
26 random number RP,  $0 < \text{RP} < 1$ , using the technique described in 6.6.7.2. The persistence  
27 test is said to pass when RP is less than the current value of P for the type of this access  
28 attempt. If P equals 0, the access attempt fails; then the mobile station shall end the  
29 access attempt, update its registration variables as specified in 6.6.5.5.3.2, and enter the  
30 *System Determination Substate of the Mobile Station Initialization State* with an access  
31 denied indication (see 6.6.1.1).

32 If the Access Channel request is a registration, P shall be computed by

$$33 \quad P = \begin{cases} 2^{-\text{PSIST}(n)/4} \times 2^{-\text{REG\_PSIST}} & \text{if } \text{PSIST}(n) \neq 63 \\ 0 & \text{otherwise} \end{cases} \quad n = 0, 1, \dots, 9$$

$$34 \quad P = \begin{cases} 2^{-\text{PSIST}(n)} \times 2^{-\text{REG\_PSIST}} & \text{if } \text{PSIST}(n) \neq 7 \\ 0 & \text{otherwise} \end{cases} \quad n = 10, 11, \dots, 15$$

35 where n is the overload class ( $\text{ACCOLC}_p$ ) assigned to the mobile station, and  $\text{PSIST}(n)$  and  
36  $\text{REG\_PSIST}$  are from the *Access Parameters Message*.

1 If the Access Channel request is a message transmission, P shall be computed by

$$2 \quad P = \begin{cases} 2^{-PSIST(n)/4} \times 2^{-MSG\_PSIST} & \text{if } PSIST(n) \neq 63 \\ 0 & \text{otherwise} \end{cases} \quad n = 0, 1, \dots, 9$$

$$3 \quad P = \begin{cases} 2^{-PSIST(n)} \times 2^{-MSG\_PSIST} & \text{if } PSIST(n) \neq 7 \\ 0 & \text{otherwise} \end{cases} \quad n = 10, 11, \dots, 15$$

4 where n is the overload class assigned to the mobile station, and PSIST(n) and MSG\_PSIST  
5 are from the *Access Parameters Message*.

6 If the Access Channel request is other than a registration or a message transmission, P  
7 shall be computed by

$$8 \quad P = \begin{cases} 2^{-PSIST(n)/4} & \text{if } PSIST(n) \neq 63 \\ 0 & \text{otherwise} \end{cases} \quad n = 0, 1, \dots, 9$$

$$10 \quad P = \begin{cases} 2^{-PSIST(n)} & \text{if } PSIST(n) \neq 7 \\ 0 & \text{otherwise} \end{cases} \quad n = 10, 11, \dots, 15$$

11 where n is the overload class assigned to the mobile station, and PSIST(n) is from the *Access  
12 Parameters Message*.

13 The mobile station shall transmit the first probe in each access probe sequence at the  
14 power level specified in 6.1.2.3.1. The mobile station shall transmit each subsequent probe  
15 in the access probe sequence at a power level PWR\_STEP<sub>s</sub> dB greater than that of the  
16 previous probe. Between access probes, the mobile station shall disable its transmitter.

17 After transmitting each probe, the mobile station shall wait TA = (2 + ACC\_TMO<sub>s</sub>) × 80 ms  
18 from the end of the Access Channel slot. If no acknowledgement is received within TA  
19 seconds, the mobile station shall perform the following:

- 20 • If NUM\_STEP<sub>s</sub> or fewer access probes have been transmitted in this access probe  
21 sequence, the mobile station shall generate a random number, RT, from 0 to 1 +  
22 PROBE\_BKOFF, using the procedure described in 6.6.7.2. The mobile station shall  
23 delay RT additional Access Channel slots, and then transmit the next access probe.
- 24 • Otherwise, if fewer than MAX\_REQ\_SEQ (for a request access) or MAX\_RSP\_SEQ (for  
25 a response access) access probe sequences have been transmitted in this access  
26 attempt, the mobile station shall begin the randomization procedures for another  
27 access probe sequence.
- 28 • Otherwise, the mobile station shall update its registration variables as specified in  
29 6.6.5.5.3.2 and enter the *System Determination Substate* of the *Mobile Station*  
30 *Initialization State* with a system lost indication (see 6.6.1.1).

1 6.6.3.1.2 Acknowledgement Procedures

2 The acknowledgement procedures facilitate the reliable exchange of messages between the  
3 base station and the mobile station. The mobile station uses the fields ACK\_TYPE  
4 (acknowledgement address type), ACK\_SEQ (acknowledgement sequence number),  
5 MSG\_SEQ (message sequence number), ACK\_REQ (acknowledgement required), and  
6 VALID\_ACK (valid acknowledgement) to support this mechanism. These fields are referred  
7 to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2  
8 procedures. All other message fields and the processing thereof are referred to as  
9 pertaining to layer 3. (See Appendix C for further discussion of layering.)

10 The mobile station shall perform duplicate detection and process duplicate messages as  
11 specified in 6.6.2.1.2.

12 The mobile station shall set the ACK\_TYPE, ACK\_SEQ and VALID\_ACK fields of all  
13 messages sent on the Access Channel as specified in 6.6.2.1.2.

14 The mobile station shall generate a single set of MSG\_SEQ numbers for messages sent on  
15 the Access Channel. The mobile station shall set the MSG\_SEQ field to '000' in the first  
16 message sent on the Access Channel after powering on. The mobile station may set the  
17 MSG\_SEQ field to '000' in the first message sent on the Access Channel after a transition  
18 from analog mode into CDMA mode. The mobile station shall increment MSG\_SEQ, modulo  
19 8, for each new access attempt, even if the contents of the new message are identical to  
20 those of the previous message.

21 The mobile station shall monitor the Paging Channel while in the *System Access State*.  
22 When the mobile station receives a message with the VALID\_ACK field set to '1' and the  
23 ACK\_SEQ field set to the MSG\_SEQ number of the message currently being sent, the  
24 mobile station shall consider the current message to have been acknowledged and shall end  
25 the access attempt.

26 If no message requiring acknowledgement has been received, the mobile station shall not  
27 include an acknowledgement in any transmitted message until a message is received that  
28 requires acknowledgement. After a message including an acknowledgement has been sent,  
29 the mobile station shall not include an acknowledgement in any subsequent transmitted  
30 message until another message is received that requires acknowledgement.

31 Unless otherwise specified in the requirements for processing a specific message, the mobile  
32 station shall transmit an acknowledgement in response to any message received that is  
33 addressed to the mobile station and that has the ACK\_REQ field set to '1'. If a specific  
34 message is required in response to any other message requiring acknowledgement, the  
35 acknowledgement shall be included with the response. If no specific message is required to  
36 be transmitted in response to a received message requiring acknowledgement, the mobile  
37 station shall include the acknowledgement in a *Mobile Station Acknowledgement Order* (see  
38 6.7.3).

39 The mobile station shall not begin a new access attempt until the previous access attempt  
40 has ended.

### 6.6.3.1.3 Handoffs

While in the *System Access State*, the mobile station should continue its pilot search (see 6.6.2.1.4.1), but shall not perform idle handoffs.

### 6.6.3.1.4 System Access State Exit Procedures

Upon exiting the *System Access State*, the mobile station shall abort any access attempt in progress and discard the associated message. The mobile station shall then disable the *System Access State* timer.

### 6.6.3.1.5 Access Channel Address Composition

When in the *System Access State*, the mobile station shall determine the type of address to use for all Access Channel messages as follows (see 6.7.1.3.1.1):

- The mobile station shall set MSID\_TYPE equal to '000' and shall use IMSI\_S and the ESN as the mobile station identifier if either of the following conditions are met:
  - The base station is not sending the *Extended System Parameters Message* on the Paging Channel (EXT\_SYS\_PARAMETER is equal to '0'), or
  - The base station is sending the *Extended System Parameters Message* on the Paging Channel (EXT\_SYS\_PARAMETER is equal to '1') and PREF\_MSID\_TYPE\_S is equal to '00'.
- The mobile station shall set MSID\_TYPE to '001' and shall use the ESN as the mobile station identifier if the two following conditions are met:
  - The base station is sending the *Extended System Parameters Message* on the Paging Channel (EXT\_SYS\_PARAMETER is equal to '1'), and
  - The mobile station has not been assigned an IMSI.
- The mobile station shall set MSID\_TYPE to '010' and shall use the IMSI as the mobile station identifier if the three following conditions are met:
  - The base station is sending the *Extended System Parameters Message* on the Paging Channel (EXT\_SYS\_PARAMETER is equal to '1').
  - The mobile station has been assigned an IMSI, and
  - PREF\_MSID\_TYPE\_S is equal to '10' and '01'.
- The mobile station shall set MSID\_TYPE to '011' and shall use both the IMSI and the ESN as the mobile station identifier if the three following conditions are met:
  - The base station is sending the *Extended System Parameters Message* on the Paging Channel (EXT\_SYS\_PARAMETER is equal to '1').
  - The mobile station has been assigned an IMSI, and
  - PREF\_MSID\_TYPE\_S is equal to '11'.

When the IMSI is used in the MSID field, the mobile station shall use the following procedures:

- 1     • The mobile station shall set IMSI\_CLASS to '0' and IMSI\_CLASS\_0\_TYPE to '00' if all  
2     the following conditions are met:
  - 3         - The mobile station has a class 0 IMSI assigned,
  - 4         - IMSI\_11\_12<sub>p</sub> is equal to IMSI\_11\_12<sub>s</sub>, and
  - 5         - MCC<sub>p</sub> is equal to MCC<sub>s</sub>.
- 6     • The mobile station shall set IMSI\_CLASS to '0' and IMSI\_CLASS\_0\_TYPE to '01' if all  
7     the following conditions are met:
  - 8         - The mobile station has a class 0 IMSI assigned,
  - 9         - IMSI\_11\_12<sub>p</sub> is not equal to IMSI\_11\_12<sub>s</sub>, and
  - 10        - MCC<sub>p</sub> is equal to MCC<sub>s</sub>.
- 11    • The mobile station shall set IMSI\_CLASS to '0' and IMSI\_CLASS\_0\_TYPE to '10' if all  
12    the following conditions are met:
  - 13        - The mobile station has a class 0 IMSI assigned,
  - 14        - IMSI\_11\_12<sub>p</sub> is equal to IMSI\_11\_12<sub>s</sub> and
  - 15        - MCC<sub>p</sub> is not equal to MCC<sub>s</sub>.
- 16    • The mobile station shall set IMSI\_CLASS to '0' and IMSI\_CLASS\_0\_TYPE to '11' if all  
17    the following conditions are met:
  - 18        - The mobile station has a class 0 IMSI assigned,
  - 19        - IMSI\_11\_12<sub>p</sub> is not equal to IMSI\_11\_12<sub>s</sub>, and
  - 20        - MCC<sub>p</sub> is not equal to MCC<sub>s</sub>.
- 21    • The mobile station shall set IMSI\_CLASS to '1' and IMSI\_CLASS\_1\_TYPE to '0' if all  
22    the following conditions are met:
  - 23        - The mobile station has a class 1 IMSI assigned, and
  - 24        - MCC<sub>p</sub> is equal to MCC<sub>s</sub>.
- 25    • The mobile station shall set IMSI\_CLASS to '1' and IMSI\_CLASS\_1\_TYPE to '1' if all  
26    the following conditions are met:
  - 27        - The mobile station has a class 1 IMSI assigned, and
  - 28        - MCC<sub>p</sub> is not equal to MCC<sub>s</sub>.

#### 29    6.6.3.2 Update Overhead Information Substate

30    In this substate, the mobile station monitors the Paging Channel until it has received the  
31    current configuration messages. The mobile station compares sequence numbers to  
32    determine whether all the configuration messages are up to date. To make sure it has the  
33    latest access parameters, the mobile station receives at least one message containing the  
34    ACC\_MSG\_SEQ field (except in case of a page response, since the initiating *General Page*  
35    *Message*, *Page Message* or *Slotted Page Message* contains ACC\_MSG\_SEQ), and waits, if  
36    necessary, for an *Access Parameters Message*.



1 Upon entering the *Update Overhead Information Substate*, the mobile station shall set the  
 2 *System Access State* timer to a value of  $T_{41m}$  seconds. The mobile station shall set PAGED  
 3 to NO. If the *Update Overhead Information Substate* was entered with a page response  
 4 indication, the mobile station shall set CURR\_ACC\_MSG\_SEQ to ACC\_MSG\_SEQ<sub>s</sub>;  
 5 otherwise, it shall set CURR\_ACC\_MSG\_SEQ to NULL.

6 If the *System Access State* timer expires while in this substate, the mobile station shall  
 7 enter the *System Determination Substate* of the *Mobile Station Initialization State* with a  
 8 system lost indication (see 6.6.1.1).

9 While in the *Update Overhead Information Substate*, the mobile station shall monitor the  
 10 Paging Channel. If the mobile station declares a loss of the Paging Channel (see 6.4.3), it  
 11 shall enter the *Mobile Station Idle State*.

12 If the mobile station receives any of the following messages, it shall process the message as  
 13 follows:

- 14 1. *System Parameters Message*: The mobile station shall process the parameters  
 15 from the message (see 6.6.2.2.1).
- 16 2. *Access Parameters Message*: The mobile station shall process the parameters from  
 17 the message (see 6.6.2.2.2).
- 18 3. *Neighbor List Message*: The mobile station shall process the parameters from the  
 19 message (see 6.6.2.2.3).
- 20 4. *CDMA Channel List Message*: The mobile station shall process the parameters  
 21 from the message (see 6.6.2.2.4).
- 22 5. *Extended System Parameters Message*: The mobile station shall process the  
 23 parameters from the message (see 6.6.2.2.5).
- 24 6. *Global Service Redirection Message*: The mobile station shall process the  
 25 parameters from the message (see 6.6.2.2.6).
- 26 7. *Lock Until Power-Cycled Order*: If the ADDRESS field matches the corresponding  
 27 mobile station identification data, the mobile station shall record the reason for the  
 28 *Lock Until Power-Cycled Order* in the mobile station's semi-permanent memory  
 29 (LCKRSN\_P<sub>s-p</sub> equals the least-significant four bits of ORDQ<sub>r</sub>). The mobile station  
 30 should notify the user of the locked condition. The mobile station shall then enter  
 31 the *System Determination Substate* of the *Mobile Station Initialization State* with a  
 32 lock indication (see 6.6.1.1), and shall not enter the *System Access State* again  
 33 until after the next mobile station power-up or until it has received an *Unlock*  
 34 *Order*. This requirement shall take precedence over any other mobile station  
 35 requirement specifying entry to the *System Access State*.

36 If the mobile station receives any of the following messages, it may process the message;  
 37 otherwise, the mobile station shall ignore the message. If the mobile station processes the  
 38 message, it shall process the message as described.

- 39 1. *Slotted Page Message*: The mobile station shall set CURR\_ACC\_MSG\_SEQ to  
 40 ACC\_MSG\_SEQ<sub>r</sub>. If this substate was not entered with an origination or page  
 41 response indication, the mobile station shall determine whether there is a page

1 match (see 6.6.2.3). If a match is declared, the mobile station shall set PAGED to  
2 YES.

3 2. Page Message: The mobile station shall set CURR\_ACC\_MSG\_SEQ to  
4 ACC\_MSG\_SEQ<sub>r</sub>. If this substate was not entered with an origination or page  
5 response indication, the mobile station shall determine whether there is a page  
6 match (see 6.6.2.3). If a match is declared, the mobile station shall set PAGED to  
7 YES.

8 3. General Page Message: The mobile station shall set CURR\_ACC\_MSG\_SEQ to  
9 ACC\_MSG\_SEQ<sub>r</sub>. If this substate was not entered with an origination or page  
10 response indication, the mobile station shall determine whether there is a page  
11 match (see 6.6.2.3). If a match is declared, the mobile station shall set PAGED to  
12 YES.

13 If the mobile station receives a message which is not included in the above lists, the mobile  
14 station shall ignore the message.

15 When the stored configuration parameters are current (see 6.6.2.2) and  
16 CURR\_ACC\_MSG\_SEQ and ACC\_MSG\_SEQ<sub>s</sub> are equal and are not NULL, the mobile  
17 station shall disable the *System Access State* timer and do one of the following:

- 18 • If PAGED is equal to YES or if this substate was entered with a page response  
19 indication, the mobile station shall determine whether the message resulting in the  
20 page match was received on the current Paging Channel. If the message was received  
21 on the current Paging Channel, the mobile station shall enter the *Page Response*  
22 *Substate*; otherwise, the mobile station shall enter the *Mobile Station Idle State*.
- 23 • If this substate was entered with a page response retransmission indication, the  
24 mobile station shall enter the *Page Response Substate*.
- 25 • If this substate was entered with an origination indication, the mobile station shall  
26 enter the *Mobile Station Origination Attempt Substate*.
- 27 • If this substate was entered with an order/message response indication, the mobile  
28 station shall determine whether the message resulting in the response was received  
29 on the current Paging Channel. If the message was received on the current Paging  
30 Channel, the mobile station shall enter the *Mobile Station Order/Message Response*  
31 *Substate*; otherwise, the mobile station shall discard the response and enter the  
32 *Mobile Station Idle State*.
- 33 • If this substate was entered with a registration indication, the mobile station shall  
34 enter the *Registration Access Substate*.
- 35 • If this substate was entered with a message transmission indication, the mobile  
36 station shall enter the *Mobile Station Message Transmission Substate*.

### 37 6.6.3.3 Page Response Substate

38 In this substate, the mobile station sends a *Page Response Message* in response to a  
39 *General Page Message*, *Page Message* or *Slotted Page Message* from the base station. If the

1 base station responds to the *Page Response Message* with an authentication request, the  
2 mobile station responds in this substate.

3 Upon entering the *Page Response Substate*, the mobile station shall send a *Page Response*  
4 *Message*, using the access procedures specified in 6.6.3.1.1.2. If message authentication is  
5 enabled (see 6.3.12.1), the mobile station shall calculate the values of the AUTHR and  
6 RANDC fields using the current value of RAND<sub>s</sub>.

7 While in this substate, the mobile station shall monitor the Paging Channel. If the mobile  
8 station declares a loss of the Paging Channel (see 6.4.3), it shall disable its transmitter and  
9 enter the *Mobile Station Idle State*. If the mobile station receives an acknowledgement to  
10 any message sent by the mobile station in this substate, the mobile station shall end the  
11 access attempt.

12 If the access attempt for the *Page Response Message* ends by the receipt of an  
13 acknowledgement from the base station, the mobile station shall update its registration  
14 variables as specified in 6.6.5.5.3.1.

15 If the *System Access State* timer expires while in this substate, the mobile station shall  
16 enter the *Mobile Station Idle State*.

17 The mobile station shall set and disable the *System Access State* timer as follows:

- 18 • The mobile station shall disable the timer whenever it begins an access attempt.
- 19 • The mobile station shall set the timer to T<sub>42m</sub> seconds whenever it ends an access  
20 attempt.
- 21 • The mobile station shall disable the timer whenever it exits the *System Access State*.

22 If a mobile station receives any message with a MSG\_TYPE specified in Table 7.7.2.3-1  
23 addressed to the mobile station, it shall process the ACK\_SEQ and VALID\_ACK fields of  
24 layer 2 as specified in 6.6.3.1.2. If, after processing the ACK\_SEQ and VALID\_ACK fields,  
25 an access attempt is still in progress, the mobile station shall ignore the ACK\_REQ field of  
26 layer 2 and the layer 3 fields of the message. Otherwise, the mobile station shall process  
27 the ACK\_REQ field as described in 6.6.3.1.2 and the layer 3 fields of the message as  
28 described below.

29 If as a result of processing the layer 3 fields of a message requiring an acknowledgement,  
30 the mobile station is to exit the *System Access State*, the mobile station shall send an  
31 acknowledgement (see 6.6.3.1.2) using the access procedures specified in 6.6.3.1.1 and  
32 then exit the *System Access State*. The following directed messages and orders can be  
33 received. If any field value of the message or order is outside its permissible range, the  
34 mobile station may send a *Mobile Station Reject Order* with ORDQ equal to '00000100'  
35 (message field not in valid range).

- 36 1. *Authentication Challenge Message*: The mobile station shall respond to the message  
37 as specified in 6.3.12.1.5, regardless of the value of AUTH<sub>s</sub>, using the access  
38 procedures specified in 6.6.3.1.1.2.
- 39 2. *Base Station Challenge Confirmation Order*: The mobile station shall respond to the  
40 message as specified in 6.3.12.1.9, using the access procedures specified in  
41 6.6.3.1.1.2.

3. Channel Assignment Message: The mobile station shall process the message as follows:

If ASSIGN\_MODE<sub>r</sub> equals '000', the mobile station shall store the Forward Traffic Channel code channel (CODE\_CHAN<sub>s</sub> = CODE\_CHAN<sub>r</sub>), the frame offset (FRAME\_OFFSET<sub>s</sub> = FRAME\_OFFSET<sub>r</sub>), the message encryption mode indicator (ENCRYPT\_MODE<sub>s</sub> = ENCRYPT\_MODE<sub>r</sub>), and, if FREQ\_INCL<sub>r</sub> equals '1', the frequency assignment (CDMACH<sub>s</sub> = CDMA\_FREQ<sub>r</sub>), and then enter the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*.

If ASSIGN\_MODE<sub>r</sub> equals '001', the mobile station shall perform the following actions: If the message requires an acknowledgement, the mobile station shall send an acknowledgement (see 6.6.3.1.2) using the access procedures specified in 6.6.3.1.1. Then, if a CDMA channel (CDMA\_FREQ) is listed in the assignment, the mobile station shall set CDMACH<sub>s</sub> = CDMA\_FREQ<sub>r</sub>, tune to the new frequency assignment, and measure the strength of each pilot listed in the assignment using the Neighbor Set search procedures specified in 6.6.6.2.1 and 6.6.6.2.2. The mobile station shall set ACC\_MSG\_SEQ<sub>s</sub> to NULL (see 6.6.2.2) and shall set PILOT\_PN<sub>s</sub> to the pilot PN sequence offset of the strongest pilot in the list (PILOT\_PN<sub>r</sub>). If the mobile station has not stored configuration parameters for the Primary Paging Channel of the new base station, or if the stored information is not current (see 6.6.2.2), the mobile station shall set CONFIG\_MSG\_SEQ<sub>s</sub>, SYS\_PAR\_MSG\_SEQ<sub>s</sub>, NGHBR\_LST\_MSG\_SEQ<sub>s</sub>, CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> to NULL. The mobile station shall set PAGE\_CHAN<sub>s</sub> to '1' and PAGECH<sub>s</sub> to the Primary Paging Channel. The mobile station shall then begin monitoring the Primary Paging Channel of the selected base station. If RESPOND<sub>r</sub> is equal to '1', the mobile station shall enter the *Update Overhead Information Substate* with a page response retransmission indication within T<sub>34m</sub> seconds after receiving the *Channel Assignment Message*. If RESPOND<sub>r</sub> is equal to '0', the mobile station shall enter the *Mobile Station Idle State* within T<sub>34m</sub> seconds after receiving the *Channel Assignment Message*.

If ASSIGN\_MODE<sub>r</sub> equals '010' and RESPOND<sub>r</sub> equals '1', the mobile station shall enter the Initialization Task with a page response indication (see 2.6.1).

If ASSIGN\_MODE<sub>r</sub> equals '010' and RESPOND<sub>r</sub> equals '0', the mobile station shall enter the Initialization Task with a wait for page indication (see 2.6.1).

If ASSIGN\_MODE<sub>r</sub> equals '011' and the analog channel type is '00', the mobile station shall store the system identification (SID<sub>s</sub> = SID<sub>r</sub>), voice mobile station attenuation code (VMAC<sub>s</sub> = VMAC<sub>r</sub>), voice channel number (ANALOG\_CHAN<sub>s</sub> = ANALOG\_CHAN<sub>r</sub>), SAT color code (SCC<sub>s</sub> = SCC<sub>r</sub>), and message encryption mode indicator (MEM<sub>s</sub> = MEM<sub>r</sub>) and enter the Confirm Initial Voice Channel Task (see 2.6.4.2) with a page response indication. If ASSIGN\_MODE<sub>r</sub> equals '011', the analog channel type is not '00', and the mobile supports narrow analog mode, the mobile station shall store the system identification (SID<sub>s</sub> = SID<sub>r</sub>), voice mobile station attenuation code (VMAC<sub>s</sub> = VMAC<sub>r</sub>), voice channel number

( $ANALOG\_CHAN_s = ANALOG\_CHAN_r$ ), message encryption mode indicator ( $MEM_s = MEM_r$ ), analog channel type ( $AN\_CHAN\_TYPE_s = AN\_CHAN\_TYPE_r$ ) and the digital SAT code ( $DSCC_s = DSCC\_MSB_r \times 4 + SCC_r$ ) and enter the Confirm Initial Narrow Analog Voice Channel Task (see 2.6.5.2A of IS-91) with a page response indication. If  $ASSIGN\_MODE$  equals '011', the analog channel type is not '00', and the mobile station does not support narrow analog mode, the mobile station shall send a *Mobile Station Reject Order* with the  $ORDQ$  field set to '00000110' (capability not supported by the mobile station) and the mobile station shall remain in the *Page Response Substate* of the *System Access State*.

4. *Data Burst Message*

5. *Feature Notification Message*

6. *Local Control Order*

7. *Lock Until Power-Cycled Order*: The mobile station shall disable its transmitter and record the reason for the *Lock Until Power-Cycled Order* in the mobile station's semi-permanent memory ( $LCKRSN\_P_{s-p}$  equals the least significant four bits of  $ORDQ_r$ ). The mobile station should notify the user of the locked condition. The mobile station shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a lock indication (see 6.6.1.1), and shall not enter the *System Access State* again until after the next mobile station power-up or until it has received an *Unlock Order*. This requirement shall take precedence over any other mobile station requirement specifying entry to the *System Access State*.

8. *Maintenance Required Order*: The mobile station shall record the reason for the *Maintenance Required Order* in the mobile station's semi-permanent memory ( $MAINTRSN_{s-p}$  equals the least significant four bits of  $ORDQ_r$ ). The mobile station shall remain in the unlocked condition. The mobile station should notify the user of the maintenance required condition.

9. *Registration Accepted Order*

10. *Registration Rejected Order*: This order indicates that normal service is not available on this system. The mobile station shall enter the *System Determination Substate* with a registration rejected indication.

11. *Release Order*: The mobile station shall enter the *Mobile Station Idle State* or the *System Determination Substate* of the *Mobile Station Initialization State* with a release indication (see 6.6.1.1).

12. *Service Redirection Message*: The mobile station shall set  $RETURN\_IF\_FAIL_s = RETURN\_IF\_FAIL_r$ , and shall set  $REDIRECT\_REC_s$  = the redirection record from the received message. The mobile station shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a redirection indication (see 6.6.1.1).

13. *SSD Update Message*: The mobile station shall respond to the message as specified in 6.3.12.1.9, using the access procedures specified in 6.6.3.1.1.2.

14. Any other message: If the mobile station receives any other message with a MSG\_TYPE specified in Table 7.7.2.3-1, it shall process all layer 2 fields of the message and shall ignore all other fields. The mobile station shall ignore all other messages.

#### 6.6.3.4 Mobile Station Order/Message Response Substate

In this substate, the mobile station sends a message that is a response to a message received from the base station. If the base station responds to the mobile station's message with an authentication request, the mobile station responds in this substate.

Upon entering the *Mobile Station Order/Message Response Substate*, the mobile station shall send the response message using the access procedures specified in 6.6.3.1.1.2.

While in this substate, the mobile station shall monitor the Paging Channel. If the mobile station declares a loss of the Paging Channel (see 6.4.3), it shall disable its transmitter and enter the *Mobile Station Idle State*. If the mobile station receives an acknowledgement to any message sent by the mobile station in this substate, it shall end the access attempt, send an acknowledgement if required, send a response in this substate if required, and shall then enter the *Mobile Station Idle State*.

If a mobile station receives any message with a MSG\_TYPE specified in Table 7.7.2.3-1 addressed to the mobile station, it shall process the ACK\_SEQ and VALID\_ACK fields of layer 2 as specified in 6.6.3.1.2. If, after processing the ACK\_SEQ and VALID\_ACK fields, an access attempt is still in progress, the mobile station shall ignore the ACK\_REQ field of layer 2 and the layer 3 fields of the message. Otherwise, the mobile station shall process the ACK\_REQ field as described in 6.6.3.1.2 and the layer 3 fields of the message as described below.

If as a result of processing the layer 3 fields of a message requiring an acknowledgement, the mobile station is to exit the *System Access State*, the mobile station shall send an acknowledgement (see 6.6.3.1.2) using the access procedures specified in 6.6.3.1.1 and then exit the *System Access State*. The following directed messages and orders can be received. If any field value of the message or order is outside its permissible range, the mobile station may send a *Mobile Station Reject Order* with ORDQ equal to '00000100' (message field not in valid range).

1. Authentication Challenge Message: The mobile station shall respond to the message as specified in 6.3.12.1.5, regardless of the value of AUTH<sub>s</sub>, using the access procedures specified in 6.6.3.1.1.2.
2. Base Station Challenge Confirmation Order: The mobile station shall respond to the message as specified in 6.3.12.1.9, using the access procedures specified in 6.6.3.1.1.2.
3. Data Burst Message
4. Feature Notification Message
5. Local Control Order

- 1      6. Lock Until Power-Cycled Order: The mobile station shall disable its transmitter and  
2      record the reason for the *Lock Until Power-Cycled Order* in the mobile station's  
3      semi-permanent memory (LCKRSN<sub>P</sub>-p equals the least significant four bits of  
4      ORDQ<sub>r</sub>). The mobile station should notify the user of the locked condition. The  
5      mobile station shall enter the *System Determination Substate* of the *Mobile Station*  
6      *Initialization State* with a lock indication (see 6.6.1.1), and shall not enter the  
7      *System Access State* again until after the next mobile station power-up or until it  
8      has received an *Unlock Order*. This requirement shall take precedence over any  
9      other mobile station requirement specifying entry to the *System Access State*.
- 10     7. Maintenance Required Order: The mobile station shall record the reason for the  
11     *Maintenance Required Order* in the mobile station's semi-permanent memory  
12     (MAINTRSN<sub>S</sub>-p equals the least significant four bits of ORDQ<sub>r</sub>). The mobile station  
13     shall remain in the unlocked condition. The mobile station should notify the user  
14     of the maintenance required condition.
- 15     8. Registration Accepted Order
- 16     9. Registration Rejected Order: This order indicates that normal service is not  
17     available on this system. The mobile station shall enter the *System Determination*  
18     *Substate* with a registration rejected indication.
- 19     10. Service Redirection Message: The mobile station shall set RETURN\_IF\_FAIL<sub>s</sub> =  
20     RETURN\_IF\_FAIL<sub>r</sub>, and shall set REDIRECT\_REC<sub>s</sub> = the redirection record from the  
21     received message. The mobile station shall enter the *System Determination*  
22     *Substate* of the *Mobile Station Initialization State* with a redirection indication (see  
23     6.6.1.1).
- 24     11. SSD Update Message: The mobile station shall respond to the message as  
25     specified in 6.3.12.1.9, using the access procedures specified in 6.6.3.1.1.2.
- 26     12. Any other message: If the mobile station receives any other message with a  
27     MSG\_TYPE specified in Table 7.7.2.3-1, it shall process all layer 2 fields of the  
28     message and shall ignore all other fields. The mobile station shall ignore all other  
29     messages.

#### 30    6.6.3.5 Mobile Station Origination Attempt Substate

31    In this substate, the mobile station sends an *Origination Message*. If the base station  
32    responds to the *Origination Message* with an authentication request, the mobile station  
33    responds in this substate.

34    Upon entering the *Mobile Station Origination Attempt Substate*, the mobile station shall send  
35    the *Origination Message* using the access procedures specified in 6.6.3.1.1.2. The mobile  
36    station shall include in the *Origination Message* as many of the dialed digits as possible  
37    without exceeding the message capsule size. If message authentication is enabled (see  
38    6.3.12.1), the mobile station shall calculate the values of the AUTHR and RANDC fields  
39    using the current value of RAND<sub>s</sub>.

40    While in this substate, the mobile station shall monitor the Paging Channel. If the mobile  
41    station declares a loss of the Paging Channel (see 6.4.3), it shall disable its transmitter and

1 enter the *Mobile Station Idle State*. If the mobile station receives an acknowledgement to  
 2 any message sent by the mobile station in this substate, it shall end the access attempt.  
 3 If the access attempt for the *Origination Message* ends by the receipt of an  
 4 acknowledgement from the base station, the mobile station shall update its registration  
 5 variables as specified in 6.6.5.5.3.1.

6 The mobile station shall set and disable the *System Access State* timer as follows:

- 7 • The mobile station shall disable the timer whenever it begins an access attempt.
- 8 • The mobile station shall set the timer to  $T_{42m}$  seconds whenever it ends an access  
 9 attempt.
- 10 • The mobile station shall disable the timer whenever it exits the *System Access State*.

11 If the *System Access State* timer expires while in this substate, the mobile station shall  
 12 enter the *Mobile Station Idle State*.

13 If the mobile station is directed by the user to disconnect the call, the mobile station shall  
 14 abort any access attempt in progress and enter the *System Determination Substate* of the  
 15 *Mobile Station Initialization State* with a release indication (see 6.6.1.1).

16 If a mobile station receives any message with a MSG\_TYPE specified in Table 7.7.2.3-1  
 17 addressed to the mobile station, it shall process the ACK\_SEQ and VALID\_ACK fields of  
 18 layer 2 as specified in 6.6.3.1.2. If, after processing the ACK\_SEQ and VALID\_ACK fields,  
 19 an access attempt is still in progress, the mobile station shall ignore the ACK\_REQ field of  
 20 layer 2 and the layer 3 fields of the message. Otherwise, the mobile station shall process  
 21 the ACK\_REQ field as described in 6.6.3.1.2 and the layer 3 fields of the message as  
 22 described below.

23 If as a result of processing the layer 3 fields of a message requiring an acknowledgement,  
 24 the mobile station is to exit the *System Access State*, the mobile station shall send an  
 25 acknowledgement (see 6.6.3.1.2) using the access procedures specified in 6.6.3.1.1 and  
 26 then exit the *System Access State*. The following directed messages and orders can be  
 27 received. If any field value of the message or order is outside its permissible range, the  
 28 mobile station may send a *Mobile Station Reject Order* with ORDQ equal to '00000100'  
 29 (message field not in valid range).

- 30 1. Authentication Challenge Message: The mobile station shall respond to the message  
 31 as specified in 6.3.12.1.5, regardless of the value of AUTH<sub>s</sub>, using the access  
 32 procedures specified in 6.6.3.1.1.2.
- 33 2. Base Station Challenge Confirmation Order: The mobile station shall respond to the  
 34 message as specified in 6.3.12.1.9, using the access procedures specified in  
 35 6.6.3.1.1.2.
- 36 3. Channel Assignment Message: The mobile station shall process the message as  
 37 follows:  
 38 If ASSIGN\_MODE<sub>r</sub> equals '000', the mobile station shall store the Forward Traffic  
 39 Channel code channel (CODE\_CHAN<sub>s</sub> = CODE\_CHAN<sub>r</sub>), the frame offset  
 40 (FRAME\_OFFSET<sub>s</sub> = FRAME\_OFFSET<sub>r</sub>), the message encryption mode indicator



(ENCRYPT\_MODE<sub>s</sub> = ENCRYPT\_MODE<sub>r</sub>), and, if FREQ\_INCL<sub>r</sub> equals '1', the frequency assignment (CDMACH<sub>s</sub> = CDMA\_FREQ<sub>r</sub>), and then enter the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the Traffic Channel State*.

If ASSIGN\_MODE<sub>r</sub> equals '001', the mobile station shall perform the following actions: If the message requires an acknowledgement, the mobile station shall send an acknowledgement (see 6.6.3.1.2) using the access procedures specified in 6.6.3.1.1. Then, if a CDMA channel (CDMA\_FREQ) is specified in the assignment, the mobile station shall set CDMACH<sub>s</sub> = CDMA\_FREQ<sub>r</sub>, tune to the new frequency assignment, and measure the strength of each pilot listed in the assignment using the Neighbor Set search procedures specified in 6.6.6.2.1 and 6.6.6.2.2. The mobile station shall set ACC\_MSG\_SEQ<sub>s</sub> to NULL (see 6.6.2.2) and shall set PILOT\_PN<sub>s</sub> to the pilot PN sequence offset of the strongest pilot in the list (PILOT\_PN<sub>r</sub>). If the mobile station has not stored configuration parameters for the Primary Paging Channel of the new base station, or if the stored information is not current (see 6.6.2.2), the mobile station shall set CONFIG\_MSG\_SEQ<sub>s</sub>, SYS\_PAR\_MSG\_SEQ<sub>s</sub>, NGHBR\_LST\_MSG\_SEQ<sub>s</sub>, CHAN\_LST\_MSG\_SEQ<sub>s</sub>, EXT\_SYS\_PAR\_MSG\_SEQ<sub>s</sub>, and GLOB\_SERV\_REDIR\_MSG\_SEQ<sub>s</sub> to NULL. The mobile station shall set PAGE\_CHAN<sub>s</sub> to '1' and PAGECH<sub>s</sub> to the Primary Paging Channel. The mobile station shall then begin monitoring the Primary Paging Channel of the selected base station. If RESPOND<sub>r</sub> is equal to '1', the mobile station shall enter the *Update Overhead Information Substate* with an origination indication.

If ASSIGN\_MODE<sub>r</sub> equals '010' and RESPOND<sub>r</sub> equals '1', the mobile station shall enter the Initialization Task with an origination indication (see 2.6.1).

If ASSIGN\_MODE<sub>r</sub> equals '011' and the analog channel type is '00', the mobile station shall store the system identification (SID<sub>s</sub> = SID<sub>r</sub>), voice mobile station attenuation code (VMAC<sub>s</sub> = VMAC<sub>r</sub>), voice channel number (ANALOG\_CHAN<sub>s</sub> = ANALOG\_CHAN<sub>r</sub>), SAT color code (SCC<sub>s</sub> = SCC<sub>r</sub>), and message encryption mode indicator (MEM<sub>s</sub> = MEM<sub>r</sub>) and enter the Confirm Initial Voice Channel Task (see 2.6.4.2) with an origination indication. If ASSIGN\_MODE<sub>r</sub> equals '011', the analog channel type is not '00', and the mobile supports narrow analog mode, the mobile station shall store the system identification (SID<sub>s</sub> = SID<sub>r</sub>), voice mobile station attenuation code (VMAC<sub>s</sub> = VMAC<sub>r</sub>), voice channel number (ANALOG\_CHAN<sub>s</sub> = ANALOG\_CHAN<sub>r</sub>), message encryption mode indicator (MEM<sub>s</sub> = MEM<sub>r</sub>), analog channel type (AN\_CHAN\_TYPE<sub>s</sub> = AN\_CHAN\_TYPE<sub>r</sub>) and the digital SAT code (DSCC<sub>s</sub> = DSCC\_MSB<sub>r</sub> × 4 + SCC<sub>r</sub>) and enter the Confirm Initial Narrow Analog Voice Channel Task (see 2.6.5.2A of IS-91) with an origination indication. If ASSIGN\_MODE equals '011', the analog channel type is not '00', and the mobile station does not support narrow analog mode, the mobile station shall send a *Mobile Station Reject Order* with the ORDQ field set to '00000110' (capability not supported by the mobile station) and the mobile station shall remain in the *Mobile Station Origination Attempt Substate* of the *System Access State*.

#### 4. Data Burst Message

- 1       5. Feature Notification Message: If  $RELEASE_r$  is equal to '1', the mobile station shall  
2       enter the *Mobile Station Idle State* or the *System Determination Substate* of the  
3       *Mobile Station Initialization State* with a release indication (see 6.6.1.1).
- 4       6. Intercept Order: The mobile station shall enter the *Mobile Station Idle State*.
- 5       7. Local Control Order
- 6       8. Lock Until Power-Cycled Order: The mobile station shall disable its transmitter and  
7       record the reason for the *Lock Until Power-Cycled Order* in the mobile station's  
8       semi-permanent memory ( $LCKRSN_{s-p}$  equals the least significant four bits of  
9        $ORDQ_r$ ). The mobile station should notify the user of the locked condition. The  
10      mobile station shall enter the *System Determination Substate* of the *Mobile Station*  
11      *Initialization State* with a lock indication (see 6.6.1.1), and shall not enter the  
12      *System Access State* again until after the next mobile station power-up or until it  
13      has received an *Unlock Order*. This requirement shall take precedence over any  
14      other mobile station requirement specifying entry to the *System Access State*.
- 15     9. Maintenance Required Order: The mobile station shall record the reason for the  
16     *Maintenance Required Order* in the mobile station's semi-permanent memory  
17     ( $MAINTRSN_{s-p}$  equals the least significant four bits of  $ORDQ_r$ ). The mobile station  
18     shall remain in the unlocked condition. The mobile station should notify the user  
19     of the maintenance required condition.
- 20     10. Registration Accepted Order
- 21     11. Registration Rejected Order: This order indicates that normal service is not  
22     available on this system. The mobile station shall enter the *System Determination*  
23     *Substate* with a registration rejected indication.
- 24     12. Release Order: The mobile station shall enter the *Mobile Station Idle State* or the  
25     *System Determination Substate* of the *Mobile Station Initialization State* with a  
26     release indication (see 6.6.1.1).
- 27     13. Reorder Order: The mobile station shall enter the *Mobile Station Idle State*.
- 28     14. Service Redirection Message: The mobile station shall set  $RETURN\_IF\_FAIL_s =$   
29      $RETURN\_IF\_FAIL_r$ , and shall set  $REDIRECT\_REC_s =$  the redirection record from the  
30     received message. The mobile station shall enter the *System Determination*  
31     *Substate* of the *Mobile Station Initialization State* with a redirection indication (see  
32     6.6.1.1).
- 33     15. SSD Update Message: The mobile station shall respond to the message as specified  
34     in 6.3.12.1.9, using the access procedures specified in 6.6.3.1.1.2.
- 35     16. Any other message: If the mobile station receives any other message with a  
36      $MSG\_TYPE$  specified in Table 7.7.2.3-1, it shall process all layer 2 fields of the  
37     message and shall ignore all other fields. The mobile station shall ignore all other  
38     messages.

#### 6.6.3.6 Registration Access Substate

In this substate, the mobile station sends a *Registration Message*. If the base station responds with an authentication request, the mobile station responds in this substate.

Upon entering the *Registration Access Substate*, the mobile station shall send the *Registration Message*, using the access procedures specified in 6.6.3.1.1.2. If message authentication is enabled (see 6.3.12.1), the mobile station shall calculate the values of the AUTHR and RANDC fields using the current value of RAND<sub>s</sub>.

While in this substate, the mobile station shall monitor the Paging Channel. If the mobile station declares a loss of the Paging Channel (see 6.4.3), it shall disable its transmitter and enter the *Mobile Station Idle State*. If the mobile station receives an acknowledgement to any message sent by the mobile station in this substate, it shall end the access attempt, send an acknowledgement if required, and shall then enter the *Mobile Station Idle State* unless:

- If the registration access was initiated due to a user direction to power down, the mobile station shall update registration variables as specified in 6.6.5.5.3.3 and may power down. The power down may occur prior to the transmission of an acknowledgement that may have been required by the most recently received message.
- If the message requires a response, the mobile station shall send a response to the message in this substate.

If the access attempt for a *Registration Message* ends by the receipt of an acknowledgement from the base station, the mobile station shall update its registration variables as specified in 6.6.5.5.3.1.

If the mobile station is directed by the user to originate a call, the mobile station may abort any access attempt in progress and enter the *Mobile Station Origination Attempt Substate*.

If the mobile station receives a *General Page Message*, *Page Message*, or a *Slotted Page Message*, the mobile station may determine if there is a page match (see 6.6.2.3). If a match is declared, the mobile station shall abort any access attempt in progress and enter the *Page Response Substate*.

If a mobile station receives any message with a MSG\_TYPE specified in Table 7.7.2.3-1 addressed to the mobile station, it shall process the ACK\_SEQ and VALID\_ACK fields of layer 2 as specified in 6.6.3.1.2. If, after processing the ACK\_SEQ and VALID\_ACK fields, an access attempt is still in progress, the mobile station shall ignore the ACK\_REQ field of layer 2 and the layer 3 fields of the message. Otherwise, the mobile station shall process the ACK\_REQ field as described in 6.6.3.1.2 and the layer 3 fields of the message as described below.

If as a result of processing the layer 3 fields of a message requiring an acknowledgement, the mobile station is to exit the *System Access State*, the mobile station shall send an acknowledgement (see 6.6.3.1.2) using the access procedures specified in 6.6.3.1.1 and then exit the *System Access State*. The following directed messages and orders can be received. If any field value of the message or order is outside its permissible range, the

- 1 mobile station may send a *Mobile Station Reject Order* with  $ORDQ$  equal to '00000100'  
2 (message field not in valid range).
- 3 1. *Authentication Challenge Message*: If the registration access was initiated due to a  
4 user direction to power down, the mobile station shall ignore the message.  
5 Otherwise, the mobile station shall respond to the message as specified in  
6 6.3.12.1.5, regardless of the value of  $AUTH_s$ , using the access procedures specified  
7 in 6.6.3.1.1.2.
  - 8 2. *Base Station Challenge Confirmation Order*: If the registration access was initiated  
9 due to a user direction to power down, the mobile station shall ignore the message.  
10 Otherwise, the mobile station shall respond to the message as specified in  
11 6.3.12.1.9, using the access procedures specified in 6.6.3.1.1.2.
  - 12 3. *Data Burst Message*
  - 13 4. *Feature Notification Message*
  - 14 5. *Local Control Order*
  - 15 6. *Lock Until Power-Cycled Order*: The mobile station shall disable its transmitter and  
16 record the reason for the *Lock Until Power-Cycled Order* in the mobile station's  
17 semi-permanent memory ( $LCKRSN_{s-p}$  equals the least significant four bits of  
18  $ORDQ_r$ ). The mobile station should notify the user of the locked condition. The  
19 mobile station shall enter the *System Determination Substate* of the *Mobile Station*  
20 *Initialization State* with a lock indication (see 6.6.1.1), and shall not enter the  
21 *System Access State* again until after the next mobile station power-up or until it  
22 has received an *Unlock Order*. This requirement shall take precedence over any  
23 other mobile station requirement specifying entry to the *System Access State*.
  - 24 7. *Maintenance Required Order*: The mobile station shall record the reason for the  
25 *Maintenance Required Order* in the mobile station's semi-permanent memory  
26 ( $MAINTRSN_{s-p}$  equals the least significant four bits of  $ORDQ_r$ ). The mobile station  
27 shall remain in the unlocked condition. The mobile station should notify the user  
28 of the maintenance required condition.
  - 29 8. *Registration Accepted Order*
  - 30 9. *Registration Rejected Order*: This order indicates that normal service is not  
31 available on this system. The mobile station shall enter the *System Determination*  
32 *Substate* with a registration rejected indication.
  - 33 10. *Release Order*: The mobile station shall enter the *Mobile Station Idle State* or the  
34 *System Determination Substate* of the *Mobile Station Initialization State* with a  
35 release indication (see 6.6.1.1).
  - 36 11. *Service Redirection Message*: The mobile station shall set  $RETURN\_IF\_FAIL_s =$   
37  $RETURN\_IF\_FAIL_r$ , and shall set  $REDIRECT\_REC_s =$  the redirection record from the  
38 received message. The mobile station shall enter the *System Determination*  
39 *Substate* of the *Mobile Station Initialization State* with a redirection indication (see  
40 6.6.1.1).

- 1       12. SSD Update Message: If the registration access was initiated due to a user  
2       direction to power down, the mobile station shall ignore the message. Otherwise,  
3       the mobile station shall respond to the message as specified in 6.3.12.1.9, using  
4       the access procedures specified in 6.6.3.1.1.2.
- 5       13. Any other message: If the mobile station receives any other message with a  
6       MSG\_TYPE specified in Table 7.7.2.3-1, it shall process all layer 2 fields of the  
7       message and shall ignore all other fields. The mobile station shall ignore all other  
8       messages.

9       6.6.3.7 Mobile Station Message Transmission Substate

10      In this substate, the mobile station sends a *Data Burst Message*. If the base station  
11      responds with an authentication request, the mobile station responds in this substate.

12      Support of this substate is optional.

13      Upon entering the *Mobile Station Message Transmission Substate*, the mobile station shall  
14      transmit the *Data Burst Message* using the access procedures specified in 6.6.3.1.1.2. If  
15      message authentication is enabled (see 6.3.12.1), the mobile station shall calculate the  
16      values of the AUTHR and RANDC fields using the current value of RAND<sub>S</sub>.

17      While in this substate, the mobile station shall monitor the Paging Channel. If the mobile  
18      station declares a loss of the Paging Channel (see 6.4.3), it shall disable its transmitter and  
19      enter the *Mobile Station Idle State*. If the mobile station receives an acknowledgement to  
20      any message sent by the mobile station in this substate, it shall end the access attempt,  
21      send an acknowledgement if required, send a response in this substate if required, and  
22      shall then enter the *Mobile Station Idle State*.

23      If the mobile station receives a *General Page Message*, *Page Message* or a *Slotted Page*  
24      *Message*, the mobile station may determine if there is a page match (see 6.6.2.3). If a  
25      match is declared, the mobile station shall abort any access attempt in progress and enter  
26      the *Page Response Substate*. The mobile station may store the message for later  
27      transmission.

28      If a mobile station receives any message with a MSG\_TYPE specified in Table 7.7.2.3-1  
29      addressed to the mobile station, it shall process the ACK\_SEQ and VALID\_ACK fields of  
30      layer 2 as specified in 6.6.3.1.2. If, after processing the ACK\_SEQ and VALID\_ACK fields,  
31      an access attempt is still in progress, the mobile station shall ignore the ACK\_REQ field of  
32      layer 2 and the layer 3 fields of the message. Otherwise, the mobile station shall process  
33      the ACK\_REQ field as described in 6.6.3.1.2 and the layer 3 fields of the message as  
34      described below.

35      If as a result of processing the layer 3 fields of a message requiring an acknowledgement,  
36      the mobile station is to exit the *System Access State*, the mobile station shall send an  
37      acknowledgement (see 6.6.3.1.2) using the access procedures specified in 6.6.3.1.1 and  
38      then exit the *System Access State*. The following directed messages and orders can be  
39      received. If any field value of the message or order is outside its permissible range, the  
40      mobile station may send a *Mobile Station Reject Order* with ORDQ equal to '00000100'  
41      (message field not in valid range).

- 1     1. Authentication Challenge Message: The mobile station shall respond to the  
2     message as specified in 6.3.12.1.5, regardless of the value of  $AUTH_s$ , using the  
3     access procedures specified in 6.6.3.1.1.2.
- 4     2. Base Station Challenge Confirmation Order: The mobile station shall respond to  
5     the message as specified in 6.3.12.1.9, using the access procedures specified in  
6     6.6.3.1.1.2.
- 7     3. Data Burst Message
- 8     4. Local Control Order
- 9     5. Lock Until Power-Cycled Order: The mobile station shall disable its transmitter and  
10    record the reason for the *Lock Until Power-Cycled Order* in the mobile station's  
11    semi-permanent memory ( $LCKRSN_{s-p}$  equals the least significant four bits of  
12     $ORDQ_r$ ). The mobile station should notify the user of the locked condition. The  
13    mobile station shall enter the *System Determination Substate* of the *Mobile Station*  
14    *Initialization State* with a lock indication (see 6.6.1.1), and shall not enter the  
15    *System Access State* again until after the next mobile station power-up or until it  
16    has received an *Unlock Order*. This requirement shall take precedence over any  
17    other mobile station requirement specifying entry to the *System Access State*.
- 18    6. Maintenance Required Order: The mobile station shall record the reason for the  
19    *Maintenance Required Order* in the mobile station's semi-permanent memory  
20    ( $MAINTRSN_{s-p}$  equals the least significant four bits of  $ORDQ_r$ ). The mobile station  
21    shall remain in the unlocked condition. The mobile station should notify the user  
22    of the maintenance required condition.
- 23    7. Registration Accepted Order
- 24    8. Registration Rejected Order: This order indicates that normal service is not  
25    available on this system. The mobile station shall enter the *System Determination*  
26    *Substate* with a registration rejected indication.
- 27    9. Service Redirection Message: The mobile station shall set  $RETURN\_IF\_FAIL_s =$   
28     $RETURN\_IF\_FAIL_r$ , and shall set  $REDIRECT\_REC_s =$  the redirection record from the  
29    received message. The mobile station shall enter the *System Determination*  
30    *Substate* of the *Mobile Station Initialization State* with a redirection indication (see  
31    6.6.1.1).
- 32    10. SSD Update Message: The mobile station shall respond to the message as specified  
33    in 6.3.12.1.9, using the access procedures specified in 6.6.3.1.1.2.
- 34    11. Any other message: If the mobile station receives any other message with a  
35     $MSG\_TYPE$  specified in Table 7.7.2.3-1, it shall process all layer 2 fields of the  
36    message and shall ignore all other fields. The mobile station shall ignore all other  
37    messages.

1    6.6.4 Mobile Station Control on the Traffic Channel State

2    In this state, the mobile station communicates with the base station using the Forward and  
3    Reverse Traffic Channels.

4    As illustrated in Figure 6.6.4-1, the *Mobile Station Control on the Traffic Channel State*  
5    consists of the following substates:

- 6        • *Traffic Channel Initialization Substate* - In this substate, the mobile station verifies  
7           that it can receive the Forward Traffic Channel and begins transmitting on the  
8           Reverse Traffic Channel.
- 9        • *Waiting for Order Substate* - In this substate, the mobile station waits for an *Alert*  
10           *With Information Message*.
- 11       • *Waiting for Mobile Station Answer Substate* - In this substate, the mobile station waits  
12           for the user to answer the call.
- 13       • *Conversation Substate* - In this substate, the mobile station's primary service option  
14           application exchanges primary traffic packets with the base station.
- 15       • *Release Substate* - In this substate, the mobile station disconnects the call.

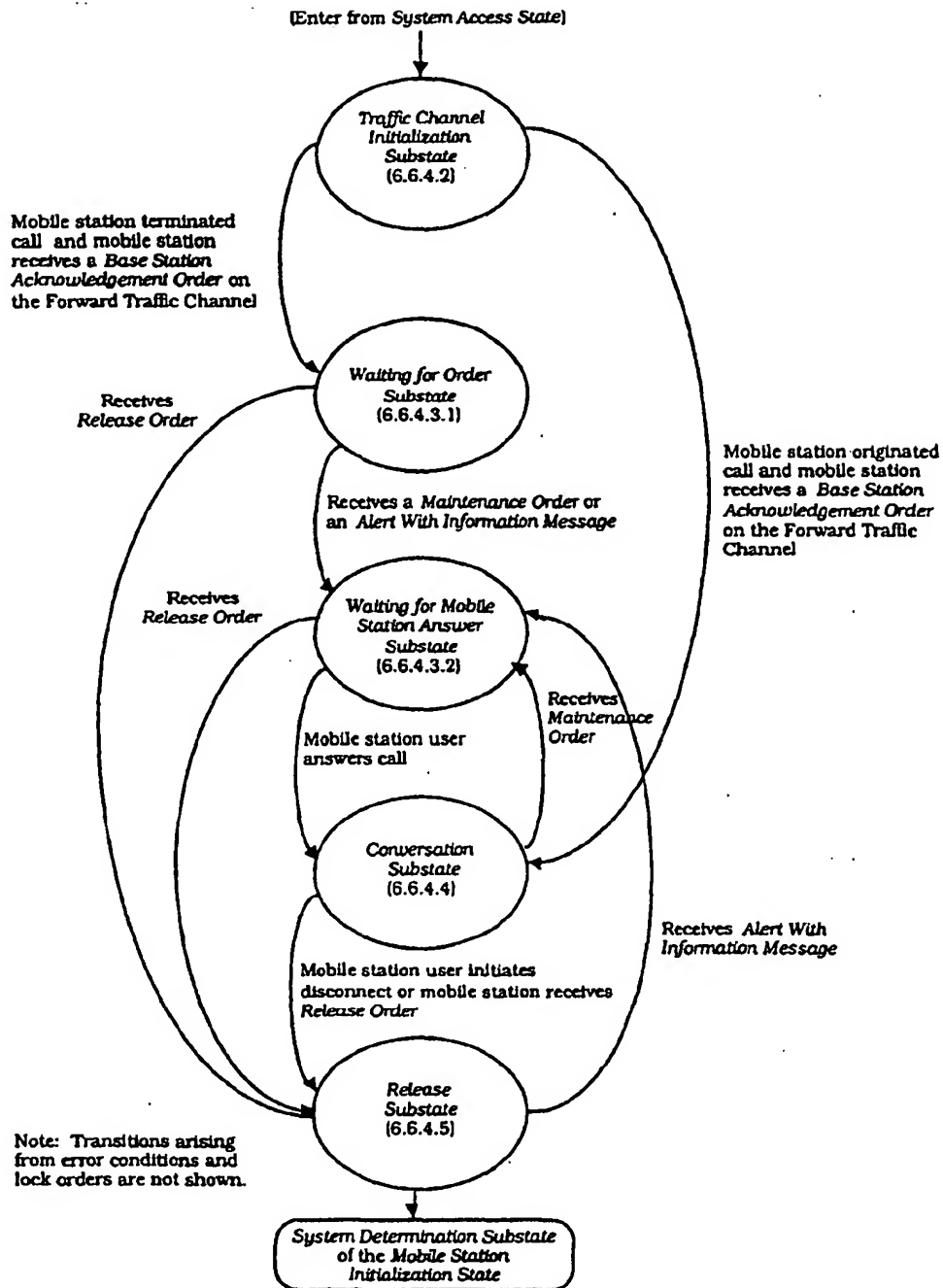


Figure 6.6.4-1. Mobile Station Control on the Traffic Channel State



#### 6.6.4.1 Special Functions and Actions

The mobile station performs the following special functions and actions in one or more of the substates of the *Mobile Station Control on the Traffic Channel State*.

##### 6.6.4.1.1 Forward Traffic Channel Power Control

To support Forward Traffic Channel power control, the mobile station reports frame error rate statistics to the base station. If the base station enables periodic reporting, the mobile station reports frame error rate statistics at specified intervals. If the base station enables threshold reporting, the mobile station reports frame error rate statistics when the frame error rate reaches a specified threshold.<sup>17</sup>

The mobile station shall maintain a counter (TOT\_FRAMES<sub>s</sub>) for the total number of received frames and a counter (BAD\_FRAMES<sub>s</sub>) for the number of received bad frames, where bad frames are defined as frame categories 9 and 10 (see 6.2.2.2).

The mobile station shall perform the following for each received frame:

- The mobile station shall increment TOT\_FRAMES<sub>s</sub> by 1.
- If the received frame is bad, the mobile station shall increment BAD\_FRAMES<sub>s</sub> by 1.
- If either
  - PWR\_THRESH\_ENABLE<sub>s</sub> is equal to '1' and BAD\_FRAMES<sub>s</sub> is equal to PWR\_REP\_THRESH<sub>s</sub> or
  - PWR\_PERIOD\_ENABLE<sub>s</sub> is equal to '1' and TOT\_FRAMES<sub>s</sub> is equal to  $\lfloor (2(PWR\_REP\_FRAMES_s/2) \times 5) \rfloor$ ,
 then the mobile station shall send a *Power Measurement Report Message* to the base station. The mobile station should send the *Power Measurement Report Message* as a message not requiring acknowledgement. After sending a *Power Measurement Report Message*, the mobile station shall set TOT\_FRAMES<sub>s</sub> and BAD\_FRAMES<sub>s</sub> to zero and shall not increment either counter for a period of PWR\_REP\_DELAY<sub>s</sub> × 4 frames following the first transmission of the message.
- If TOT\_FRAMES<sub>s</sub> is equal to  $\lfloor (2(PWR\_REP\_FRAMES_s/2) \times 5) \rfloor$  the mobile station shall set TOT\_FRAMES<sub>s</sub> and BAD\_FRAMES<sub>s</sub> to zero.

##### 6.6.4.1.1.1 Forward Traffic Channel Power Control Initialization

To initialize Forward Traffic Channel power control, the mobile station shall set TOT\_FRAMES<sub>s</sub> and BAD\_FRAMES<sub>s</sub> to zero.

---

<sup>17</sup>Both periodic and threshold reporting may be enabled simultaneously, either one of them may be enabled, or both forms of reporting may be disabled at any given time.

#### 6.6.4.1.1.2 Processing the Power Control Parameters Message

The mobile station shall store the following parameters from the *Power Control Parameters Message*:

- Power control reporting threshold ( $PWR\_REP\_THRESH_s = PWR\_REP\_THRESH_r$ )
- Power control reporting frame count ( $PWR\_REP\_FRAMES_s = PWR\_REP\_FRAMES_r$ )
- Threshold report mode indicator  
( $PWR\_THRESH\_ENABLE_s = PWR\_THRESH\_ENABLE_r$ )
- Periodic report mode indicator  
( $PWR\_PERIOD\_ENABLE_s = PWR\_PERIOD\_ENABLE_r$ )
- Power report delay ( $PWR\_REP\_DELAY_s = PWR\_REP\_DELAY_r$ )

The mobile station shall set  $TOT\_FRAMES_s$  and  $BAD\_FRAMES_s$  to zero.

#### 6.6.4.1.2 Service Options

##### 6.6.4.1.2.1 Overview

During Traffic Channel operation, the mobile station and base station may support primary traffic services. Each such service, referred to as a service option, has a set of requirements that govern the way in which the primary traffic bits (see 7.1.3.5.11 and 6.1.3.3.11) from forward and reverse Traffic Channel frames are processed by the mobile station and base station.

Either the mobile station or base station can request a service option. The mobile station can request a particular service option at the time of call origination, when responding to a page, or during Traffic Channel operation. If the service option request is acceptable to the base station, the mobile station and base station begin using the new service option. If the mobile station requests a service option that is not acceptable to the base station, the base station can reject the requested service option or request an alternative service option. If the base station requests an alternative service option, the mobile station can accept or reject the base station's alternative service option, or request another service option. This process, called service option negotiation, ends when the mobile station and base station find a mutually acceptable service option, or when the mobile station rejects a service option request from the base station or the base station rejects a service option request from the mobile station.

The mobile station and base station use the *Service Option Request Order* either to request a service option or suggest an alternative service option, and the *Service Option Response Order* to accept or reject a service option request. In addition, the mobile station can request a service option in the *Origination Message* or the *Page Response Message*, and the base station can request a service option in the *General Page Message*, the *Page Message*, or the *Slotted Page Message*. The mobile station and base station use the *Service Option Control Order* to invoke service option specific functions.

The mobile station uses a variable ( $SO\_REQ_s$ ) to record the number of the service option for which the mobile station has sent an outstanding request, either in an *Origination Message*, a *Page Response Message*, or a *Service Option Request Order*.  $SO\_REQ_s$  is set to a special

1 value, NULL, when the mobile station does not have an outstanding service option request.  
2 The mobile station uses another variable (SO\_CUR<sub>s</sub>) to record the number of the service  
3 option which is currently active. SO\_CUR<sub>s</sub> is set to NULL when there is no active service  
4 option.

#### 5 6.6.4.1.2.2 Requirements

##### 6 6.6.4.1.2.2.1 Processing the *Service Option Request Order*

7 When the mobile station receives a *Service Option Request Order*, it shall perform the  
8 following:

- 9 • If the mobile station accepts the requested service option, the mobile station shall set  
10 SO\_REQ<sub>s</sub> to NULL and shall send a *Service Option Response Order* accepting the  
11 requested service option within T<sub>58m</sub> seconds. The mobile station shall interpret the  
12 message action time of the *Service Option Request Order* in accordance with the  
13 requirements for the requested service option and shall begin using the requested  
14 service option in accordance with those requirements. The mobile station shall set  
15 SO\_CUR<sub>s</sub> to the requested service option number when the service option becomes  
16 active.
- 17 • If the mobile station does not accept the requested service option and has an  
18 alternative service option to request, the mobile station shall set SO\_REQ<sub>s</sub> to the  
19 alternative service option number and shall send a *Service Option Request Order*  
20 requesting the alternative service option within T<sub>58m</sub> seconds.
- 21 • If the mobile station does not accept the requested service option and does not have  
22 an alternative service option to request, the mobile station shall set SO\_REQ<sub>s</sub> to  
23 NULL and shall send a *Service Option Response Order* to reject the request within  
24 T<sub>58m</sub> seconds. The mobile station shall continue to process primary traffic as it did  
25 prior to receiving the *Service Option Request Order* and shall remain in the current  
26 state.

##### 27 6.6.4.1.2.2.2 Processing the *Service Option Response Order*

28 When the mobile station receives a *Service Option Response Order*, it shall perform the  
29 following:

- 30 • If the service option number specified in the order is equal to SO\_REQ<sub>s</sub>, the mobile  
31 station shall set SO\_REQ<sub>s</sub> to NULL. The mobile station shall interpret the message  
32 action time of the *Service Option Response Order* in accordance with the require-  
33 ments for the specified service option, and shall begin using the specified service  
34 option in accordance with those requirements. The mobile station shall set SO\_CUR<sub>s</sub>  
35 to the specified service option number when the service option becomes active.
- 36 • If the order indicates a service option rejection, the mobile station shall set SO\_REQ<sub>s</sub>  
37 to NULL. The mobile station shall continue to process primary traffic as it did prior  
38 to receiving the *Service Option Response Order* and shall remain in the current state.
- 39 • If the order does not indicate a service option rejection and the service option  
40 specified in the order is not equal to SO\_REQ<sub>s</sub>, the mobile station shall set SO\_REQ<sub>s</sub>

to NULL and shall send a *Mobile Station Reject Order* (ORDQ = '00000100') within  $T_{58m}$  seconds. The mobile station shall continue to process primary traffic as it did prior to receiving the *Service Option Response Order* and shall remain in the current state.

#### 6.6.4.1.2.2.3 Processing the Received *Service Option Control Order*

If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station shall interpret the message action time of the *Service Option Control Order* in accordance with the requirements for the active service option and shall process the *Service Option Control Order* in accordance with those requirements; otherwise, the mobile station shall send a *Mobile Station Reject Order* (ORDQ = '00000001') within  $T_{56m}$  seconds.

#### 6.6.4.1.2.2.4 Service Option Request Initialization

To perform service option request initialization, the mobile station shall set SO\_REQ<sub>s</sub> to the specified service option number.

#### 6.6.4.1.3 Acknowledgement Procedures

The acknowledgement procedures facilitate the reliable exchange of messages between the base station and the mobile station. The mobile station uses the fields ACK\_SEQ (acknowledgement sequence number), MSG\_SEQ (message sequence number) and ACK\_REQ (acknowledgement required indicator) to detect duplicate messages and provide a reference for acknowledgements. These message fields are referred to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2 procedures. All other message fields are referred to as layer 3 fields, and the processing of layer 3 fields is referred to as layer 3 processing. (See Appendix C for further discussion of layering.)

On both the Forward Traffic Channel and the Reverse Traffic Channel, the procedure for messages requiring acknowledgement is a selective repeat scheme in which a message is retransmitted only if an acknowledgement for it is not received.

##### 6.6.4.1.3.1 Messages Requiring Acknowledgement

A Traffic Channel message requires acknowledgement when the ACK\_REQ field is set to '1'.

##### 6.6.4.1.3.1.1 Transmitting Messages and Receiving Acknowledgements

The Layer 2 protocol does not guarantee delivery of messages in any order. If the mobile station requires that the base station receive a set of messages in a certain order, the mobile station shall wait for an acknowledgement of each message before transmitting the next message in the set. For messages requiring acknowledgement whose relative ordering is not important, the mobile station may transmit up to four such messages before receiving an acknowledgement for the first message.

The mobile station shall store a message sequence number for messages requiring acknowledgement (MSG\_SEQ\_ACK<sub>s</sub>). The mobile station shall store an acknowledgement status indicator (ACK\_WAITING<sub>s</sub>[n], where n is 0 through 7) for each possible value of the Reverse Traffic Channel message MSG\_SEQ field. The mobile station shall not send a new

- 1 message requiring acknowledgement when  $ACK\_WAITING_s[(MSG\_SEQ\_ACK_s + 4) \bmod 8]$  is  
 2 equal to YES.
- 3 The mobile station shall perform the following procedures:
- 4 • When the mobile station receives any message on the Forward Traffic Channel, it  
 5 shall set  $ACK\_WAITING_s[ACK\_SEQ_r]$  to NO.
  - 6 • When the mobile station sends a new message requiring acknowledgement on the  
 7 Reverse Traffic Channel, it shall set  $ACK\_WAITING_s[MSG\_SEQ\_ACK_s]$  to YES and  
 8 shall set the  $MSG\_SEQ$  field of the message to  $MSG\_SEQ\_ACK_s$ . The mobile station  
 9 shall then increment  $MSG\_SEQ\_ACK_s$ , modulo 8.
- 10 The mobile station shall not retransmit a message for which it has received an  
 11 acknowledgement.
- 12 If the mobile station has not received an acknowledgement within  $T_{1m}$  seconds after  
 13 transmitting the message, the mobile station shall retransmit the message (see  
 14 Figure 6.6.4.1.3.1.1-1). If the mobile station retransmits a message, the mobile station  
 15 shall use the same  $MSG\_SEQ$  number for the retransmission. The mobile station shall not  
 16 retransmit a message sooner than  $T_{1m}$  seconds after the previous transmission of the same  
 17 message.
- 18 The mobile station shall store a retransmission counter ( $RETRY\_COUNT_s$ ) for each  
 19 transmitted message requiring acknowledgement. The mobile station shall set  
 20  $RETRY\_COUNT_s$  to zero prior to the first transmission of the message. After each  
 21 transmission of the message, the mobile station shall increment  $RETRY\_COUNT_s$  if no  
 22 acknowledgement is received. When  $RETRY\_COUNT_s$  is equal to  $N_{1m}$ , the mobile station  
 23 shall declare an acknowledgement failure.

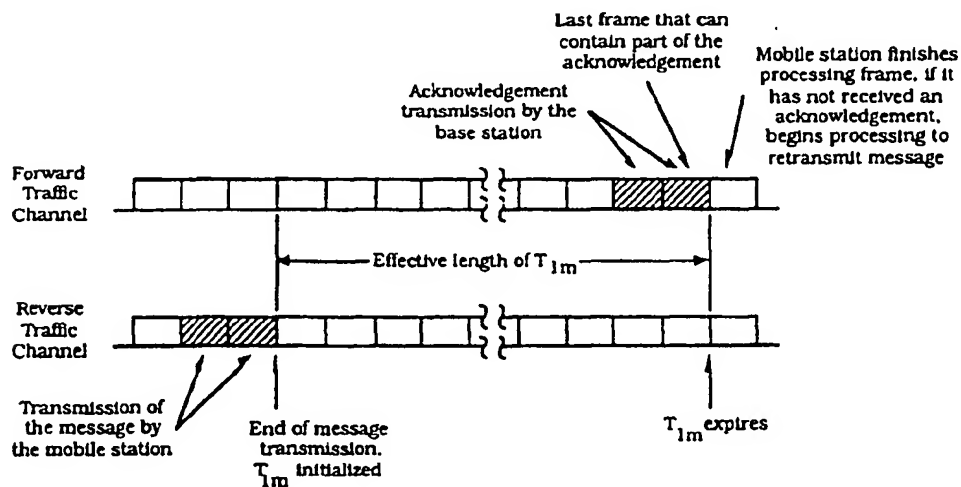


Figure 6.6.4.1.3.1.1-1. Time Limit for Acknowledgement of Reverse Traffic Channel Messages

### 6.6.4.1.3.1.2 Receiving Messages and Returning Acknowledgements

Messages received on the Forward Traffic Channel contain MSG\_SEQ fields that are incremented using the same rules as messages transmitted on the Reverse Traffic Channel. Separate sequence numbers are maintained for Forward Traffic Channel Messages that require acknowledgement and for messages that do not require acknowledgement.

The mobile station acknowledges a received message by transmitting a message with the ACK\_SEQ field set equal to the MSG\_SEQ field of the received message. A message transmitted with the ACK\_SEQ field set in this manner is referred to as including an acknowledgement of the received message.

Whenever a message requiring acknowledgement is received, the mobile station shall set the ACK\_SEQ field of subsequent Reverse Traffic Channel messages to MSG\_SEQ<sub>r</sub>. If no message has been received, the mobile station shall set this field to '111'.

After receiving a message requiring acknowledgement, the mobile station shall transmit a message including an acknowledgement within T<sub>2m</sub> seconds as shown in Figure 6.6.4.1.3.1.2-1.

When a received message requires acknowledgement and no message is available within T<sub>2m</sub> seconds after the message is received, the mobile station shall transmit a *Mobile Station Acknowledgement Order* including the acknowledgement. The *Mobile Station Acknowledgement Order* shall be sent as a message not requiring acknowledgement.

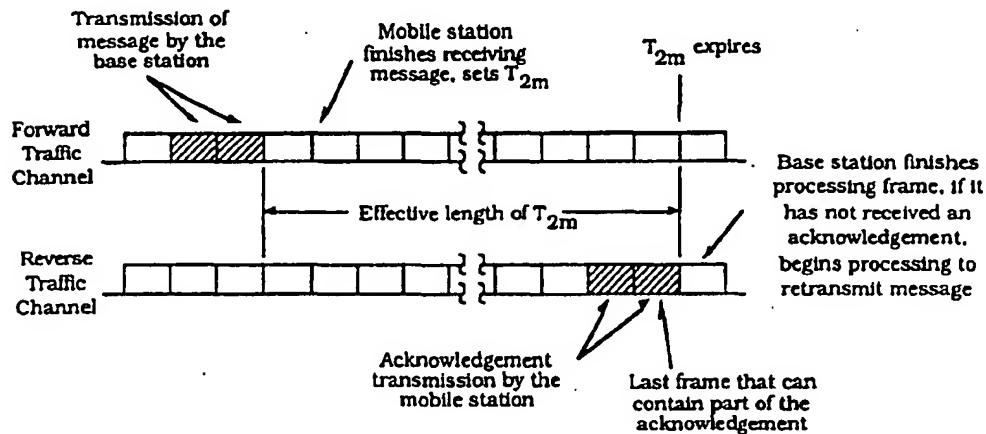


Figure 6.6.4.1.3.1.2-1. Time Limit for Acknowledgement of Forward Traffic Channel Messages

For duplicate message detection, the mobile station shall store a received status indicator for each possible value of the Forward Traffic Channel message MSG\_SEQ field (MSG\_SEQ\_RCVD<sub>s</sub>[n], where n is 0 through 7). The mobile station shall perform the following procedures:

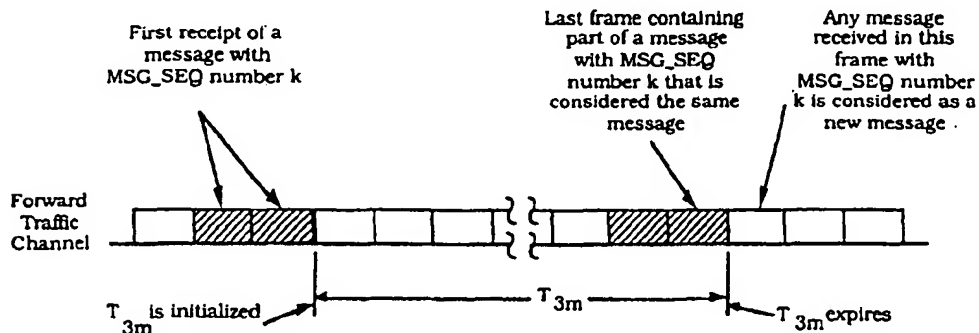
- 1 • When a message requiring acknowledgement is received with message sequence  
2 number  $MSG\_SEQ_r$ , and  $MSG\_SEQ\_RCVD_s[MSG\_SEQ_r]$  is equal to NO, the mobile  
3 station shall process the message as a new message. The mobile station shall then  
4 set  $MSG\_SEQ\_RCVD_s[MSG\_SEQ_r]$  to YES, and shall set  
5  $MSG\_SEQ\_RCVD_s[(4 + MSG\_SEQ_r) \bmod 8]$  to NO.
- 6 • When a message requiring acknowledgement is received with message sequence  
7 number  $MSG\_SEQ_r$ , and  $MSG\_SEQ\_RCVD_s[MSG\_SEQ_r]$  is equal to YES, the mobile  
8 station shall acknowledge the message but shall not perform any further processing  
9 of the message.

#### 10 6.6.4.1.3.2 Messages Not Requiring Acknowledgement

11 A Traffic Channel message does not require acknowledgement when the ACK\_REQ field is  
12 set to '0'.

13 The mobile station shall store a message sequence number for messages not requiring  
14 acknowledgement ( $MSG\_SEQ\_NOACK_s$ ). For each new message sent that does not require  
15 acknowledgement, the mobile station shall set the MSG\_SEQ field of the message to  
16  $MSG\_SEQ\_NOACK_s$  and shall then increment  $MSG\_SEQ\_NOACK_s$ , modulo 8. The mobile  
17 station shall not retransmit messages not requiring acknowledgement.

18 The mobile station shall consider all messages received within  $T_{3m}$  seconds that do not  
19 require acknowledgement and have the same MSG\_SEQ number to be duplicates, as shown  
20 in Figure 6.6.4.1.3.2-1. If the mobile station receives multiple copies of a message as  
21 determined by the MSG\_SEQ number, it shall discard the duplicate copies.



22  
23 **Figure 6.6.4.1.3.2-1. Time Window for Detecting Duplicate Messages not**  
24 **Requiring Acknowledgement**  
25

#### 26 6.6.4.1.3.3 Acknowledgement Procedures Reset

27 The mobile station shall reset the acknowledgement procedures as follows:

- 28 • Message sequence number reset.

- 1       - If ACK\_WAITING<sub>s</sub>[n] is equal to YES for any n, the mobile station should save the
- 2       corresponding messages and retransmit them after completing the reset of the
- 3       acknowledgement procedures. For each such message the mobile station shall
- 4       set the retransmission counter (RETRY\_COUNT<sub>s</sub>) to zero.
- 5       - The mobile station shall set both MSG\_SEQ\_ACK<sub>s</sub> and MSG\_SEQ\_NOACK<sub>s</sub> to 0.
- 6       and shall set ACK\_WAITING<sub>s</sub>[n] to NO for all values of n from 0 to 7.
- 7       • Acknowledgement sequence number reset. The mobile station shall set the
- 8       ACK\_SEQ field of all Reverse Traffic Channel messages to '111' until the first
- 9       message requiring acknowledgement is received.
- 10      • Duplicate detection reset. The mobile station shall set MSG\_SEQ\_RCVD<sub>s</sub>[n] to NO
- 11      for all values of n from 0 to 7.

#### 12   6.6.4.1.4 Processing the *In-Traffic System Parameters Message*

13   The mobile station shall store the following parameters from the *In-Traffic System*  
14   *Parameters Message*:

- 15      • System identification (SID<sub>s</sub> = SID<sub>r</sub>)
- 16      • Network identification (NID<sub>s</sub> = NID<sub>r</sub>)
- 17      • Search window size for the Active Set and the Candidate Set
- 18      (SRCH\_WIN\_A<sub>s</sub> = SRCH\_WIN\_A<sub>r</sub>)
- 19      • Search window size for the Neighbor Set (SRCH\_WIN\_N<sub>s</sub> = SRCH\_WIN\_N<sub>r</sub>)
- 20      • Search window size for the Remaining Set (SRCH\_WIN\_R<sub>s</sub> = SRCH\_WIN\_R<sub>r</sub>)
- 21      • Pilot detection threshold (T\_ADD<sub>s</sub> = T\_ADD<sub>r</sub>)
- 22      • Pilot drop threshold (T\_DROP<sub>s</sub> = T\_DROP<sub>r</sub>)
- 23      • Active Set versus Candidate Set comparison threshold (T\_COMP<sub>s</sub> = T\_COMP<sub>r</sub>)
- 24      • Drop timer value (T\_TDROP<sub>s</sub> = T\_TDROP<sub>r</sub>)
- 25      • Maximum age for retention of Neighbor Set members
- 26      (NGHBR\_MAX\_AGE<sub>s</sub> = NGHBR\_MAX\_AGE<sub>r</sub>)

27   The mobile station shall determine its roaming status (see 6.6.5.3). The mobile station  
28   should indicate to the user whether the mobile station is roaming.

#### 29   6.6.4.1.5 Message Action Times

30   A Forward Traffic Channel message without a USE\_TIME field or with a USE\_TIME field set  
31   to '0' has an implicit action time. A message whose USE\_TIME field is set to '1' has an  
32   explicit action time which is specified in the ACTION\_TIME field of the message. A message  
33   with an explicit action time is called a pending message.

34   Unless otherwise specified, a message having an implicit action time shall take effect no  
35   later than the first 80 ms boundary (relative to System Time) occurring at least 80 ms after  
36   the end of the frame containing the last bit of the message. A message with an explicit  
37   action time shall take effect when System Time (in 80 ms units) modulo 64 becomes equal



1 to the message's ACTION\_TIME field. The difference in time between ACTION\_TIME and the  
2 end of the frame containing the last bit of the message shall be at least 80 ms.

3 The mobile station shall support one pending message at any given time, not including  
4 pending *Service Option Control Orders*. The number of pending *Service Option Control*  
5 *Orders* that the mobile station is required to support is specific to the service option (see the  
6 relevant service option description).

#### 7 6.6.4.1.6 Long Code Transition Request Processing

8 The mobile station performs these procedures upon receiving a *Long Code Transition*  
9 *Request Order*.

10 If the *Long Code Transition Request Order* requests a transition to the private long code, and  
11 the mobile station is able to generate the private long code (see 6.3.12.3), and the mobile  
12 station accepts the request, the mobile station shall send a *Long Code Transition Response*  
13 *Order* (ORDQ = '00000011') within  $T_{56m}$  seconds. The mobile station shall use the private  
14 long code on both the Forward Traffic Channel and the Reverse Traffic Channel. The  
15 mobile station shall begin using the private long code using the explicit action time (see  
16 6.6.4.1.5) specified in the message. The mobile station should indicate to the user that the  
17 voice privacy mode is active. If the *Long Code Transition Request Order* requests a private  
18 long code transition, and the mobile station is not able to generate the private long code or  
19 the mobile station does not accept the request, the mobile station shall send a *Long Code*  
20 *Transition Response Order* (ORDQ = '00000010') within  $T_{56m}$  seconds.

21 If the *Long Code Transition Request Order* requests a transition to the public long code and  
22 the mobile station accepts the request, the mobile station shall send a *Long Code Transition*  
23 *Response Order* (ORDQ = '00000010') within  $T_{56m}$  seconds. The mobile station shall use  
24 the public long code on both the Forward Traffic Channel and the Reverse Traffic Channel.  
25 The mobile station shall begin using the public long code using the explicit action time (see  
26 6.6.4.1.5) specified in the message. The mobile station should indicate to the user that the  
27 voice privacy mode is inactive. If the *Long Code Transition Request Order* requests a public  
28 long code transition, and the mobile station does not accept the request, the mobile station  
29 shall send a *Long Code Transition Response Order* (ORDQ = '00000011') within  $T_{56m}$   
30 seconds.

#### 31 6.6.4.2 Traffic Channel Initialization Substate

32 In this substate, the mobile station verifies that it can receive the Forward Traffic Channel  
33 and begins transmitting on the Reverse Traffic Channel.

34 Upon entering the *Traffic Channel Initialization Substate*, the mobile station shall perform  
35 the following:

- 36 • The mobile station shall perform registration initialization as specified in 6.6.5.5.4.1.
- 37 • The mobile station shall reset the acknowledgement procedures as specified in  
38 6.6.4.1.3.3.
- 39 • The mobile station shall initialize Forward Traffic Channel power control as specified  
40 in 6.6.4.1.1.1.

- 1 • The mobile station shall set  $SO\_CUR_s$  to NULL to indicate that there is no active  
2 service option.
- 3 • If the call is mobile station originated and the *Origination Message* requests a special  
4 service option, the mobile station shall perform service option request initialization  
5 (see 6.6.4.1.2.2.4) specifying the special service option number.
- 6 • If the call is mobile station originated and the *Origination Message* does not request a  
7 special service option, the mobile station shall perform service option request  
8 initialization (see 6.6.4.1.2.2.4) specifying 1 (the default service option number).
- 9 • If the call is mobile station terminated, the mobile station shall perform service  
10 option request initialization (see 6.6.4.1.2.2.4) specifying the service option number  
11 requested in the *Page Response Message*.

12 While in the *Traffic Channel Initialization Substate*, the mobile station shall perform the  
13 following:

- 14 • The mobile station shall monitor the Forward Traffic Channel associated with the  
15 pilot  $PILOT\_PN_s$ .
- 16 • The mobile station shall perform pilot strength measurements as specified in  
17 6.6.6.2.2, but shall not send *Pilot Strength Measurement Messages*.
- 18 • The mobile station shall perform registration timer maintenance as specified in  
19 6.6.5.5.4.2.

20 If the mobile station does not support the assigned CDMA Channel (see 6.2.1.1) or the  
21 assigned Forward Traffic code channel (see 7.1.3.1.8), the mobile station shall enter the  
22 *System Determination Substate* of the *Mobile Station Initialization State* with an error  
23 indication.

24 If the mobile station supports the assigned CDMA Channel and the assigned Forward  
25 Traffic code channel, the mobile station shall perform the following:

- 26 • The mobile station shall tune to the assigned CDMA Channel.
- 27 • The mobile station shall set its code channel for the assigned Forward Traffic code  
28 channel.
- 29 • The mobile station shall set its Forward and Reverse Traffic Channel frame offsets to  
30 the assigned frame offset as determined by  $FRAME\_OFFSET_s$ .
- 31 • The mobile station shall set its Forward and Reverse Traffic Channel long code masks  
32 to the public long code mask (see 6.1.3.1.8).

33 If the mobile station does not receive  $N_{5m}$  consecutive good frames within  $T_{50m}$  seconds  
34 after entering this substate, the mobile station shall enter the *System Determination*  
35 *Substate* of the *Mobile Station Initialization State* with a system lost indication (see 6.6.1.1).

36 If the mobile station receives  $N_{5m}$  consecutive good frames within  $T_{50m}$  seconds after  
37 entering this substate, the mobile station shall perform the following additional functions  
38 while it remains in the *Traffic Channel Initialization Substate*:

- 1     • The mobile station shall perform Forward Traffic Channel supervision as specified in
- 2       6.4.4. If a loss of the Forward Traffic Channel is declared, the mobile station shall
- 3       enter the *System Determination Substate* of the *Mobile Station Initialization State* with
- 4       a system lost indication (see 6.6.1.1).
- 5     • The mobile station shall adjust its transmit power as specified in 6.1.2.3.
- 6     • The mobile station shall transmit the Traffic Channel preamble as specified in
- 7       6.1.3.3.2.3.
- 8     • The mobile station shall perform the acknowledgement procedures as specified in
- 9       6.6.4.1.3. If an acknowledgement failure is declared, the mobile station shall disable
- 10      its transmitter and enter the *System Determination Substate* of the *Mobile Station*
- 11      *Initialization State* with a system lost indication (see 6.6.1.1).
- 12    If the mobile station does not receive a *Base Station Acknowledgement Order* within  $T_{51m}$
- 13    seconds after entering this substate, the mobile station shall disable its transmitter and
- 14    enter the *System Determination Substate* of the *Mobile Station Initialization State* with a
- 15    system lost indication (see 6.6.1.1).
- 16    If the mobile station receives a *Base Station Acknowledgement Order* within  $T_{51m}$  seconds
- 17    after entering this substate, the mobile station shall perform the following:
- 18      • If the call is mobile station terminated, the mobile station shall enter the *Waiting for*
- 19        *Order Substate*.
- 20      • If the call is mobile station originated, the mobile station shall enter the *Conversation*
- 21        *Substate*.
- 22    6.6.4.3 Alerting
- 23    6.6.4.3.1 Waiting for Order Substate
- 24    In this substate, the mobile station waits for an *Alert With Information Message*.
- 25    Upon entering the *Waiting for Order Substate*, the mobile station shall set the substate
- 26    timer for  $T_{52m}$  seconds.
- 27    While in the *Waiting for Order Substate*, the mobile station shall perform the following:
- 28      • If the substate timer expires, the mobile station shall disable its transmitter and
- 29        enter the *System Determination Substate* of the *Mobile Station Initialization State* with
- 30        a system lost indication (see 6.6.1.1).
- 31      • The mobile station shall perform Forward Traffic Channel supervision as specified in
- 32        6.4.4. If a loss of the Forward Traffic Channel is declared, the mobile station shall
- 33        enter the *System Determination Substate* of the *Mobile Station Initialization State* with
- 34        a system lost indication (see 6.6.1.1).
- 35      • The mobile station shall adjust its transmit power as specified in 6.1.2.3.
- 36      • The mobile station shall perform Forward Traffic Channel power control as specified
- 37        in 6.6.4.1.1.
- 38      • The mobile station shall perform handoff processing as specified in 6.6.6.

- 1       • If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station  
2       shall process the received primary traffic bits in accordance with the requirements for  
3       the active service option; otherwise, the mobile station shall discard the received  
4       primary traffic bits.
- 5       • If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station  
6       shall transmit primary traffic bits in accordance with the requirements for the active  
7       service option; otherwise, the mobile station shall transmit null Traffic Channel data.
- 8       • The mobile station shall perform registration timer maintenance as specified in  
9       6.6.5.5.4.2.
- 10       • If the mobile station is directed by the user to transmit a message, the mobile station  
11       shall send a *Data Burst Message*.
- 12       • If the mobile station is directed by the user to request a service option, the mobile  
13       station shall perform service option request initialization (see 6.6.4.1.2.2.4) specifying  
14       the requested service option number, and shall send a *Service Option Request Order*  
15       (ORDQ = requested service option number).
- 16       • If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station  
17       may send a *Service Option Control Order* (ORDQ = function code) to invoke a service  
18       option specific function in accordance with the requirements for the active service  
19       option.
- 20       • If the mobile station is directed by the user to request a private long code transition  
21       and has the long code mask (see 6.3.12.3), the mobile station shall send a *Long Code*  
22       *Transition Request Order* (ORDQ = '00000001') as a message requiring  
23       acknowledgement.
- 24       • If the mobile station is directed by the user to request a public long code transition,  
25       the mobile station shall send a *Long Code Transition Request Order* (ORDQ =  
26       '00000000') as a message requiring acknowledgement.
- 27       • If the mobile station is directed by the user to operate in analog mode, allowing  
28       operation in either wide or narrow analog mode, the mobile station shall send the  
29       *Request Analog Service Order* as a message requiring acknowledgement.
- 30       • If the mobile station is directed by the user to operate in wide analog mode, the  
31       mobile station shall send the *Request Wide Analog Service Order* as a message  
32       requiring acknowledgement.
- 33       • If the mobile station is directed by the user to operate in narrow analog mode, the  
34       mobile station shall send the *Request Narrow Analog Service Order* as a message  
35       requiring acknowledgement.
- 36       • If the mobile station is directed by the user to power down, the mobile station shall  
37       enter the *Release Substate* with a power-down indication (see 6.6.4.5).
- 38       • The mobile station shall perform the acknowledgement procedures as specified in  
39       6.6.4.1.3. If an acknowledgement failure is declared, the mobile station shall disable  
40       its transmitter and enter the *System Determination Substate* of the *Mobile Station*  
41       *Initialization State* with a system lost indication (see 6.6.1.1).

- 1     • If the mobile station receives a message which is included in the following list and  
2       every message field value is within its permissible range, the mobile station shall  
3       process the message as described below and in accordance with the message's action  
4       time (see 6.6.4.1.5).
- 5       1. Alert With Information Message: If the message contains a Signal Information  
6           record, the mobile station should alert the user in accordance with the Signal  
7           Information record; otherwise, the mobile station should use standard alert as  
8           defined in 7.7.5.5. The mobile station shall enter the *Waiting for Mobile Station*  
9           *Answer Substate* (see 6.6.4.3.2).
- 10      2. Analog Handoff Direction Message: The mobile station shall process the message  
11         as specified in 6.6.6.2.9, and enter the *Waiting For Order Task* (see 2.6.4.3.1 for  
12         handoff to a wide analog channel and 2.6.5.3.1A of IS-91 for handoff to a narrow  
13         analog channel).
- 14      3. Audit Order
- 15      4. Authentication Challenge Message: The mobile station shall reset the substate  
16         timer for  $T_{52m}$  seconds. The mobile station shall then process the message and  
17         respond as specified in 6.3.12.1.5 within  $T_{32m}$  seconds, regardless of the value  
18         of  $AUTH_s$ .
- 19      5. Base Station Acknowledgement Order
- 20      6. Base Station Challenge Confirmation Order: The mobile station shall reset the  
21         substate timer for  $T_{52m}$  seconds. The mobile station shall then process the  
22         message and respond with an *SSD Update Confirmation Order* or *SSD Update*  
23         *Rejection Order* as specified in 6.3.12.1.9 within  $T_{32m}$  seconds.
- 24      7. Data Burst Message
- 25      8. Extended Handoff Direction Message: The mobile station shall process the  
26         message as specified in 6.6.6.2.5.1. The mobile station shall reset the substate  
27         timer for  $T_{52m}$  seconds.
- 28      9. Handoff Direction Message: The mobile station shall process the message as  
29         specified in 6.6.6.2.5.1. The mobile station shall reset the substate timer for  
30          $T_{52m}$  seconds.
- 31      10. In-Traffic System Parameters Message: The mobile station shall process the  
32         message as specified in 6.6.4.1.4.
- 33      11. Local Control Order
- 34      12. Lock Until Power-Cycled Order: The mobile station shall disable its transmitter  
35         and record the reason for the *Lock Until Power-Cycled Order* in the mobile  
36         station's semi-permanent memory ( $LCKRSN_{S-p}$  equals the least significant  
37         four bits of  $ORDQ_r$ ). The mobile station should notify the user of the locked  
38         condition. The mobile station shall enter the *System Determination Substate* of  
39         the *Mobile Station Initialization State* with a lock indication (see 6.6.1.1), and  
40         shall not enter the *System Access State* again until after the next mobile station  
41         power-up or until it has received an *Unlock Order*. This requirement shall take

- precedence over any other mobile station requirement specifying entry to the *System Access State*.
13. Long Code Transition Request Order: The mobile station shall process the message as specified in 6.6.4.1.6.
14. Maintenance Order: The mobile station shall enter the *Waiting for Mobile Station Answer Substate*.
15. Maintenance Required Order: The mobile station shall record the reason for the *Maintenance Required Order* in the mobile station's semi-permanent memory ( $MAINTRSN_{s-p}$  equals the least significant four bits of  $ORDQ_r$ ). The mobile station shall remain in the unlocked condition. The mobile station should notify the user of the maintenance required condition.
16. Message Encryption Mode Order: The mobile station shall process the message as specified in 6.3.12.2.
17. Mobile Station Registered Message: The mobile station shall process the message as specified in 6.6.5.5.4.3.
18. Neighbor List Update Message: The mobile station shall process the message as specified in 6.6.6.2.6.3.
19. Parameter Update Order: The mobile station shall reset the substate timer for  $T_{52m}$  seconds. The mobile station shall increment  $COUNT_{s-p}$  (see 2.3.12.1.3). The mobile station shall send a *Parameter Update Confirmation Order* within  $T_{56m}$  seconds. The mobile station shall set the  $ORDQ$  field of the *Parameter Update Confirmation Order* to the same value as the  $ORDQ$  field of the *Parameter Update Order*.
20. Pilot Measurement Request Order: The mobile station shall process the order as specified in 6.6.6.2.5.1.
21. Power Control Parameters Message: The mobile station shall process the message as specified in 6.6.4.1.1.2.
22. Release Order: The mobile station shall enter the *Release Substate* with a base station release indication (see 6.6.4.5).
23. Retrieve Parameters Message: The mobile station shall send, within  $T_{56m}$  seconds, a *Parameters Response Message*.
24. Service Option Control Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.3.
25. Service Option Request Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.1.
26. Service Option Response Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.2.
27. Set Parameters Message: If the mobile station can set all of the parameters specified by the  $PARAMETER\_ID$  fields in the message, the mobile station shall

- 1 set them; otherwise, the mobile station shall send, within  $T_{56m}$  seconds, a  
 2 *Mobile Station Reject Order*.
- 3 28. SSD Update Message: The mobile station shall reset the substate timer for  $T_{52m}$   
 4 seconds. The mobile station shall then process the message and respond with a  
 5 *Base Station Challenge Order* as specified in 6.3.12.1.9 within  $T_{32m}$  seconds.
- 6 29. Status Request Order: The mobile station shall send, within  $T_{56m}$  seconds, a  
 7 *Status Message*.
- 8 • If the mobile station receives any other message with a MSG\_TYPE specified in Table  
 9 7.7.3.3-1, it shall process all layer 2 fields of the message. If the mobile station  
 10 receives a message that is not included in the above list or cannot be processed, the  
 11 mobile station shall discard the message and send a *Mobile Station Reject Order*  
 12 (ORDQ set to the applicable reason code as determined from Table 6.7.3-1) within  
 13  $T_{56m}$  seconds.
- 14 6.6.4.3.2 Waiting for Mobile Station Answer Substate
- 15 In this substate, the mobile station waits for the user to answer the mobile station  
 16 terminated call.
- 17 Upon entering the *Waiting for Mobile Station Answer Substate*, the mobile station shall set  
 18 the substate timer for  $T_{53m}$  seconds.
- 19 While in the *Waiting for Mobile Station Answer Substate*, the mobile station shall perform  
 20 the following:
- 21 • If the substate timer expires, the mobile station shall disable its transmitter and  
 22 enter the *System Determination Substate* of the *Mobile Station Initialization State* with  
 23 a system lost indication (see 6.6.1.1).
- 24 • The mobile station shall perform Forward Traffic Channel supervision as specified in  
 25 6.4.4. If a loss of the Forward Traffic Channel is declared, the mobile station shall  
 26 enter the *System Determination Substate* of the *Mobile Station Initialization State* with  
 27 a system lost indication (see 6.6.1.1).
- 28 • The mobile station shall adjust its transmit power as specified in 6.1.2.3.
- 29 • The mobile station shall perform Forward Traffic Channel power control as specified  
 30 in 6.6.4.1.1.
- 31 • The mobile station shall perform handoff processing as specified in 6.6.6.
- 32 • If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station  
 33 shall process the received primary traffic bits in accordance with the requirements for  
 34 the active service option; otherwise, the mobile station shall discard the received  
 35 primary traffic bits.
- 36 • If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station  
 37 shall transmit primary traffic bits in accordance with the requirements for the active  
 38 service option; otherwise, the mobile station shall transmit null Traffic Channel data.

- 1     • The mobile station shall perform registration timer maintenance as specified in  
2       6.6.5.5.4.2.
- 3     • If the mobile station is directed by the user to answer the call, the mobile station  
4       shall send a *Connect Order* to the base station as a message requiring  
5       acknowledgement. The mobile station shall enter the *Conversation Substate*.
- 6     • If the mobile station is directed by the user to transmit a message, the mobile station  
7       shall send a *Data Burst Message*.
- 8     • If the mobile station is directed by the user to request a service option, the mobile  
9       station shall perform service option request initialization (see 6.6.4.1.2.2.4) specifying  
10      the requested service option number, and shall send a *Service Option Request Order*  
11      (ORDQ = requested service option number).
- 12    • If there is an active service option (SO\_CUR<sub>g</sub> is not equal to NULL), the mobile station  
13      may send a *Service Option Control Order* (ORDQ = function code) to invoke a service  
14      option specific function in accordance with the requirements for the active service  
15      option.
- 16    • If the mobile station is directed by the user to request a private long code transition  
17      and has the long code mask (see 6.3.12.3), the mobile station shall send a *Long Code*  
18      *Transition Request Order* (ORDQ = '00000001') as a message requiring  
19      acknowledgement.
- 20    • If the mobile station is directed by the user to request a public long code transition,  
21      the mobile station shall send a *Long Code Transition Request Order* (ORDQ =  
22      '00000000') as a message requiring acknowledgement.
- 23    • If the mobile station is directed by the user to operate in analog mode, allowing  
24      operation in either wide or narrow analog mode, the mobile station shall send the  
25      *Request Analog Service Order* as a message requiring acknowledgement.
- 26    • If the mobile station is directed by the user to operate in wide analog mode, the  
27      mobile station shall send the *Request Wide Analog Service Order* as a message  
28      requiring acknowledgement.
- 29    • If the mobile station is directed by the user to operate in narrow analog mode, the  
30      mobile station shall send the *Request Narrow Analog Service Order* as a message  
31      requiring acknowledgement.
- 32    • If the mobile station is directed by the user to power down, the mobile station shall  
33      enter the *Release Substate* with a power-down indication (see 6.6.4.5).
- 34    • The mobile station shall perform the acknowledgement procedures as specified in  
35      6.6.4.1.3. If an acknowledgement failure is declared, the mobile station shall disable  
36      its transmitter and enter the *System Determination Substate* of the *Mobile Station*  
37      *Initialization State* with a system lost indication (see 6.6.1.1).
- 38    • If the mobile station receives a message which is included in the following list and  
39      every message field value is within its permissible range, the mobile station shall  
40      process the message as described below and in accordance with the message's action  
41      time (see 6.6.4.1.5).



1. Alert With Information Message: The mobile station shall reset the substate timer for  $T_{53m}$  seconds. If the *Alert With Information Message* does not contain a Signal information record, the mobile station should use standard alert as defined in 7.7.5.5.
2. Analog Handoff Direction Message: The mobile station shall process the message as specified in 6.6.6.2.9 and enter the Waiting For Answer Task (see 2.6.4.3.2 for handoff to a wide analog channel and 2.6.5.3.2A of IS-91 for handoff to a narrow analog channel).
3. Audit Order
4. Authentication Challenge Message: The mobile station shall process the message and respond as specified in 6.3.12.1.5 within  $T_{32m}$  seconds, regardless of the value of  $AUTH_g$ .
5. Base Station Acknowledgement Order
6. Base Station Challenge Confirmation Order: The mobile station shall process the message and respond with an *SSD Update Confirmation Order* or *SSD Update Rejection Order* as specified in 6.3.12.1.9 within  $T_{32m}$  seconds.
7. Data Burst Message
8. Extended Handoff Direction Message: The mobile station shall process the message as specified in 6.6.6.2.5.1.
9. Handoff Direction Message: The mobile station shall process the message as specified in 6.6.6.2.5.1.
10. In-Traffic System Parameters Message: The mobile station shall process the message as specified in 6.6.4.1.4.
11. Local Control Order
12. Lock Until Power-Cycled Order: The mobile station shall disable its transmitter and record the reason for the *Lock Until Power-Cycled Order* in the mobile station's semi-permanent memory ( $LCKRSN_{P_{S-p}}$  equals the least-significant four bits of  $ORDQ_r$ ). The mobile station should notify the user of the locked condition. The mobile station shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a lock indication (see 6.6.1.1), and shall not enter the *System Access State* again until after the next mobile station power-up or until it has received an *Unlock Order*. This requirement shall take precedence over any other mobile station requirement specifying entry to the *System Access State*.
13. Long Code Transition Request Order: The mobile station shall process the message as specified in 6.6.4.1.6.
14. Maintenance Order: The mobile station shall reset the substate timer for  $T_{53m}$  seconds.
15. Maintenance Required Order: The mobile station shall record the reason for the *Maintenance Required Order* in the mobile station's semi-permanent memory

(MAINTRSN<sub>s-p</sub> equals the least-significant four bits of ORDQ<sub>r</sub>). The mobile station shall remain in the unlocked condition. The mobile station should notify the user of the maintenance required condition.

16. Message Encryption Mode Order: The mobile station shall process the message as specified in 6.3.12.2.
  17. Mobile Station Registered Message: The mobile station shall process the message as specified in 6.6.5.5.4.3.
  18. Neighbor List Update Message: The mobile station shall process the message as specified in 6.6.6.2.6.3.
  19. Parameter Update Order: The mobile station shall increment COUNT<sub>s-p</sub> (see 2.3.12.1.3). The mobile station shall send a *Parameter Update Confirmation Order* within T<sub>56m</sub> seconds. The mobile station shall set the ORDQ field of the *Parameter Update Confirmation Order* to the same value as the ORDQ field of the *Parameter Update Order*.
  20. Pilot Measurement Request Order: The mobile station shall process the order as specified in 6.6.6.2.5.1.
  21. Power Control Parameters Message: The mobile station shall process the message as specified in 6.6.4.1.1.2.
  22. Release Order: The mobile station shall enter the *Release Substate* with a base station release indication (see 6.6.4.5).
  23. Retrieve Parameters Message: The mobile station shall send, within T<sub>56m</sub> seconds, a *Parameters Response Message*.
  24. Service Option Control Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.3.
  25. Service Option Request Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.1.
  26. Service Option Response Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.2.
  27. Set Parameters Message: If the mobile station can set all of the parameters specified by the PARAMETER\_ID fields in the message, the mobile station shall set them; otherwise, the mobile station shall send, within T<sub>56m</sub> seconds, a *Mobile Station Reject Order*.
  28. SSD Update Message: The mobile station shall process the message and respond with a *Base Station Challenge Order* as specified in 6.3.12.1.9 within T<sub>32m</sub> seconds.
  29. Status Request Order: The mobile station shall send, within T<sub>56m</sub> seconds, a *Status Message*.
- If the mobile station receives any other message with a MSG\_TYPE specified in Table 7.7.3.3-1, it shall process all layer 2 fields of the message. If the mobile station receives a message that is not included in the above list or cannot be processed, the

mobile station shall discard the message and send a *Mobile Station Reject Order* (ORDQ set to the applicable reason code as determined from Table 6.7.3-1) within  $T_{56m}$  seconds.

#### 6.6.4.4 Conversation Substate

In this substate, the mobile station's primary traffic service option application exchanges primary traffic bits with the base station.

While in the *Conversation Substate*, the mobile station shall perform the following:

- The mobile station shall perform Forward Traffic Channel supervision as specified in 6.4.4. If a loss of the Forward Traffic Channel is declared, the mobile station shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a system lost indication (see 6.6.1.1).
- The mobile station shall adjust its transmit power as specified in 6.1.2.3.
- The mobile station shall perform Forward Traffic Channel power control as specified in 6.6.4.1.1.
- The mobile station shall perform handoff processing as specified in 6.6.6.
- If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station shall process the received primary traffic bits in accordance with the requirements for the active service option; otherwise, the mobile station shall discard the received primary traffic bits.
- If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station shall transmit primary traffic bits in accordance with the requirements for the active service option; otherwise, the mobile station shall transmit null Traffic Channel data.
- The mobile station shall perform registration timer maintenance as specified in 6.6.5.4.2.
- If the mobile station originated the call and did not send all the dialed digits in the *Origination Message*, the mobile station shall send the remaining dialed digits to the base station in the *Origination Continuation Message*. The mobile station shall send the *Origination Continuation Message* as a message requiring acknowledgement within  $T_{54m}$  seconds after entering the *Conversation Substate*.
- If the mobile station is directed by the user to transmit a message, the mobile station shall send a *Data Burst Message*.
- If the mobile station is directed by the user to request a service option, the mobile station shall perform service option request initialization (see 6.6.4.1.2.2.4) specifying the requested service option number, and shall send a *Service Option Request Order* (ORDQ = requested service option number).
- If there is an active service option (SO\_CUR<sub>s</sub> is not equal to NULL), the mobile station may send a *Service Option Control Order* (ORDQ = function code) to invoke a service option specific function in accordance with the requirements for the active service option.

- 1       • If the mobile station is directed by the user to request a private long code transition  
2       and has the long code mask (see 6.3.12.3), the mobile station shall send a *Long Code*  
3       *Transition Request Order* (ORDQ = '00000001') as a message requiring  
4       acknowledgement.
- 5       • If the mobile station is directed by the user to request a public long code transition,  
6       the mobile station shall send a *Long Code Transition Request Order* (ORDQ =  
7       '00000000') as a message requiring acknowledgement.
- 8       • If the mobile station is directed by the user to issue a flash, the mobile station shall  
9       build a *Flash With Information Message* with the collected digits contained in a  
10      *Keypad Facility* information record and send the message to the base station as a  
11      message requiring acknowledgement.
- 12      • If the mobile station is directed by the user to send burst DTMF digits, the mobile  
13      station shall build the *Send Burst DTMF Message* with the dialed digits and send the  
14      message as a message requiring acknowledgement.
- 15      • If the mobile station is directed by the user to send a continuous DTMF digit, the  
16      mobile station shall build the *Continuous DTMF Tone Order* with the dialed digit and  
17      send the order as a message requiring acknowledgement. When the mobile station is  
18      directed by the user to cease sending the continuous DTMF digit, the mobile station  
19      shall send the *Continuous DTMF Tone Order* (ORDQ = '11111111') as a message  
20      requiring acknowledgement.
- 21      • If the mobile station is directed by the user to operate in analog mode, allowing  
22      operation in either wide or narrow analog mode, the mobile station shall send the  
23      *Request Analog Service Order* as a message requiring acknowledgement.
- 24      • If the mobile station is directed by the user to operate in wide analog mode, the  
25      mobile station shall send the *Request Wide Analog Service Order* as a message  
26      requiring acknowledgement.
- 27      • If the mobile station is directed by the user to operate in narrow analog mode, the  
28      mobile station shall send the *Request Narrow Analog Service Order* as a message  
29      requiring acknowledgement.
- 30      • If the mobile station is directed by the user to disconnect the call, the mobile station  
31      shall enter the *Release Substate* with a mobile station release indication (see 6.6.4.5).
- 32      • If the mobile station is directed by the user to power down, the mobile station shall  
33      enter the *Release Substate* with a power-down indication (see 6.6.4.5).
- 34      • The mobile station shall perform the acknowledgement procedures as specified in  
35      6.6.4.1.3. If an acknowledgement failure is declared, the mobile station shall disable  
36      its transmitter and enter the *System Determination Substate* of the *Mobile Station*  
37      *Initialization State* with a system lost indication (see 6.6.1.1).
- 38      • If the mobile station receives a message which is included in the following list and  
39      every message field value is within its permissible range, the mobile station shall  
40      process the message as described below and in accordance with the message's action  
41      time (see 6.6.4.1.5).

- 1       1. Alert With Information Message: If the message contains a Signal information  
2       record with the SIGNAL\_TYPE field set to '01' or '10', or if the message does not  
3       contain a Signal information record, the mobile station shall enter the *Waiting*  
4       *For Mobile Station Answer Substate*. If the *Alert With Information Message* does  
5       not contain a Signal information record, the mobile station should use standard  
6       alert as defined in 7.7.5.5.
- 7       2. Analog Handoff Direction Message: The mobile station shall process the message  
8       as specified in 6.6.6.2.9 and enter the Conversation Task (see 2.6.4.4 for handoff  
9       to a wide analog channel and 2.6.5.4A of IS-91 for handoff to a narrow analog  
10      channel).
- 11      3. Audit Order
- 12      4. Authentication Challenge Message: The mobile station shall process the message  
13      and respond as specified in 6.3.12.1.5 within  $T_{32m}$  seconds, regardless of the  
14      value of  $AUTH_S$ .
- 15      5. Base Station Acknowledgement Order
- 16      6. Base Station Challenge Confirmation Order: The mobile station shall process the  
17      message and respond with an *SSD Update Confirmation Order* or *SSD Update*  
18      *Rejection Order* as specified in 6.3.12.1.9 within  $T_{32m}$  seconds.
- 19      7. Continuous DTMF Tone Order: Support of this order by the mobile station is  
20      optional.
- 21      8. Data Burst Message
- 22      9. Extended Handoff Direction Message: The mobile station shall process the  
23      message as specified in 6.6.6.2.5.1.
- 24      10. Flash With Information Message
- 25      11. Handoff Direction Message: The mobile station shall process the message as  
26      specified in 6.6.6.2.5.1.
- 27      12. In-Traffic System Parameters Message: The mobile station shall process the  
28      message as specified in 6.6.4.1.4.
- 29      13. Local Control Order
- 30      14. Lock Until Power-Cycled Order: The mobile station shall disable its transmitter  
31      and record the reason for the *Lock Until Power-Cycled Order* in the mobile  
32      station's semi-permanent memory ( $LCKRSN_{P_{s-p}}$  equals the least-significant  
33      four bits of  $ORDQ_T$ ). The mobile station should notify the user of the locked  
34      condition. The mobile station shall enter the *System Determination Substate* of  
35      the *Mobile Station Initialization State* with a lock indication (see 6.6.1.1), and  
36      shall not enter the *System Access State* again until after the next mobile station  
37      power-up or until it has received an *Unlock Order*. This requirement shall take  
38      precedence over any other mobile station requirement specifying entry to the  
39      *System Access State*.

15. Long Code Transition Request Order: The mobile station shall process the message as specified in 6.6.4.1.6.
16. Maintenance Order: The mobile station shall enter the *Waiting for Mobile Station Answer Substate*.
17. Maintenance Required Order: The mobile station shall record the reason for the *Maintenance Required Order* in the mobile station's semi-permanent memory ( $\text{MAINTRSN}_{s-p}$  equals the least-significant four bits of  $\text{ORDQ}_r$ ). The mobile station shall remain in the unlocked condition. The mobile station should notify the user of the maintenance required condition.
18. Message Encryption Mode Order: The mobile station shall process the message as specified in 6.3.12.2.
19. Mobile Station Registered Message: The mobile station shall process the message as specified in 6.6.5.5.4.3.
20. Neighbor List Update Message: The mobile station shall process the message as specified in 6.6.6.2.6.3.
21. Parameter Update Order: The mobile station shall increment  $\text{COUNT}_{s-p}$  (see 2.3.12.1.3). The mobile station shall send a *Parameter Update Confirmation Order* within  $T_{56m}$  seconds. The mobile station shall set the  $\text{ORDQ}$  field of the *Parameter Update Confirmation Order* to the same value as the  $\text{ORDQ}$  field of the *Parameter Update Order*.
22. Pilot Measurement Request Order: The mobile station shall process the order as specified in 6.6.6.2.5.1.
23. Power Control Parameters Message: The mobile station shall process the message as specified in 6.6.4.1.1.2.
24. Release Order: The mobile station shall enter the *Release Substate* with a base station release indication (see 6.6.4.5).
25. Retrieve Parameters Message: The mobile station shall send, within  $T_{56m}$  seconds, a *Parameters Response Message*.
26. Send Burst DTMF Message: Support of this order by the mobile station is optional.
27. Service Option Control Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.3.
28. Service Option Request Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.1.
29. Service Option Response Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.2.
30. Set Parameters Message: If the mobile station can set all of the parameters specified by the  $\text{PARAMETER\_ID}$  fields in the message, the mobile station shall set them; otherwise, the mobile station shall send, within  $T_{56m}$  seconds, a *Mobile Station Reject Order*.

31. SSD Update Message: The mobile station shall process the message and respond with a *Base Station Challenge Order* as specified in 6.3.12.1.9 within  $T_{32m}$  seconds.

32. Status Request Order: The mobile station shall send, within  $T_{56m}$  seconds, a *Status Message*.

- If the mobile station receives any other message with a MSG\_TYPE specified in Table 7.7.3.3-1, it shall process all layer 2 fields of the message. If the mobile station receives a message that is not included in the above list or cannot be processed, the mobile station shall discard the message and send a *Mobile Station Reject Order* (ORDQ set to the applicable reason code as determined from Table 6.7.3-1) within  $T_{56m}$  seconds.

#### 6.6.4.5 Release Substate

In this substate, the mobile station confirms the call disconnect.

Upon entering the *Release Substate*, the mobile station shall perform the following:

- The mobile station shall set the substate timer for  $T_{55m}$  seconds.
- If the mobile station enters the *Release Substate* with a power-down indication, the mobile station shall send a *Release Order* (ORDQ = '00000001'), and perform power-down registration procedures (see 6.6.5.5.4.4).
- If the mobile station enters the *Release Substate* with a mobile station release indication, the mobile station shall send a *Release Order* (ORDQ = '00000000').
- If the mobile station enters the *Release Substate* with a base station release indication, the mobile station shall send a *Release Order* (ORDQ = '00000000'). The mobile station shall disable its transmitter and enter the *System Determination Substate* of the *Mobile Station Initialization State* with a release indication (see 6.6.1.1).

While in the *Release Substate*, the mobile station shall perform the following:

- If the substate timer expires, the mobile station shall disable its transmitter and enter the *System Determination Substate* of the *Mobile Station Initialization State* with a release indication (see 6.6.1.1).
- The mobile station shall perform Forward Traffic Channel supervision as specified in 6.4.4. If a loss of the Forward Traffic Channel is declared, the mobile station shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a release indication (see 6.6.1.1).
- The mobile station shall adjust its transmit power as specified in 6.1.2.3.
- The mobile station shall perform Forward Traffic Channel power control as specified in 6.6.4.1.1.
- The mobile station shall perform handoff processing as specified in 6.6.6.
- The mobile station shall transmit null Traffic Channel data on the Reverse Traffic Channel (see 6.1.3.3).

- 1 • The mobile station shall perform registration timer maintenance as specified in  
2 6.6.5.5.4.2.
- 3 • The mobile station shall perform the acknowledgement procedures as specified in  
4 6.6.4.1.3. If an acknowledgement failure is declared, the mobile station shall disable  
5 its transmitter and enter the *System Determination Substate* of the *Mobile Station*  
6 *Initialization State* with a release indication (see 6.6.1.1).
- 7 • If the mobile station receives a message which is included in the following list and  
8 every message field value is within its permissible range, the mobile station shall  
9 process the message as described below and in accordance with the message's action  
10 time (see 6.6.4.1.5).
  - 11 1. Alert With Information Message: The mobile station shall enter the *Waiting for*  
12 *Mobile Station Answer Substate*. If the *Alert With Information Message* does not  
13 contain a *Signal information record*, the mobile station should use standard  
14 alert as defined in 7.7.5.5.
  - 15 2. Base Station Acknowledgement Order
  - 16 3. Data Burst Message
  - 17 4. Extended Handoff Direction Message: The mobile station shall process the  
18 message as specified in 6.6.6.2.5.1.
  - 19 5. Handoff Direction Message: The mobile station shall process the message as  
20 specified in 6.6.6.2.5.1.
  - 21 6. In-Traffic System Parameters Message: The mobile station shall process the  
22 message as specified in 6.6.4.1.4.
  - 23 7. Local Control Order
  - 24 8. Lock Until Power-Cycled Order: The mobile station shall disable its transmitter  
25 and record the reason for the *Lock Until Power-Cycled Order* in the mobile  
26 station's semi-permanent memory ( $LCKRSN_{S-p}$  equals the least-significant  
27 four bits of  $ORDQ_r$ ). The mobile station should notify the user of the locked  
28 condition. The mobile station shall enter the *System Determination Substate* of  
29 the *Mobile Station Initialization State* with a lock indication (see 6.6.1.1), and  
30 shall not enter the *System Access State* again until after the next mobile station  
31 power-up or until it has received an *Unlock Order*. This requirement shall take  
32 precedence over any other mobile station requirement specifying entry to the  
33 *System Access State*.
  - 34 9. Maintenance Required Order: The mobile station shall record the reason for the  
35 *Maintenance Required Order* in the mobile station's semi-permanent memory  
36 ( $MAINTRSN_{S-p}$  equals the least-significant four bits of  $ORDQ_r$ ). The mobile  
37 station shall remain in the unlocked condition. The mobile station should notify  
38 the user of the maintenance required condition.
  - 39 10. Mobile Station Registered Message: The mobile station shall process the  
40 message as specified in 6.6.5.5.4.3.



11. Neighbor List Update Message: The mobile station shall process the message as specified in 6.6.6.2.6.3.
  12. Power Control Parameters Message: The mobile station shall process the message as specified in 6.6.4.1.1.2.
  13. Release Order: The mobile station shall disable its transmitter. If the mobile station enters the *Release Substate* with a power-down indication, the mobile station may power down; otherwise, the mobile station shall enter the *System Determination Substate* of the *Mobile Station Initialization State* with a release indication (see 6.6.1.1).
  14. Retrieve Parameters Message: The mobile station shall send, within  $T_{56m}$  seconds, a *Parameters Response Message*.
  15. Service Option Control Order: The mobile station shall process the message as specified in 6.6.4.1.2.2.3.
  16. Status Request Order: The mobile station shall send, within  $T_{56m}$  seconds, a *Status Message*.
- If the mobile station receives any other message with a MSG\_TYPE specified in Table 7.7.3.3-1, it shall process all layer 2 fields of the message. If the mobile station receives a message that is not included in the above list or cannot be processed, the mobile station shall discard the message and send a *Mobile Station Reject Order* (ORDQ set to the applicable reason code as determined from Table 6.7.3-1) within  $T_{56m}$  seconds.

## 6.6.5 Registration

### 6.6.5.1 Forms of Registration

Registration is the process by which the mobile station notifies the base station of its location, status, identification, slot cycle, and other characteristics. The mobile station informs the base station of its location and status so that the base station can efficiently page the mobile station when establishing a mobile terminated call. For operation in the slotted mode, the mobile station supplies the SLOT\_CYCLE\_INDEX parameter so that the base station can determine which slots the mobile station is monitoring. The mobile station supplies the station class mark and protocol revision number so that the base station knows the capabilities of the mobile station.

The CDMA system supports nine different forms of registration:

1. Power-up registration. The mobile station registers when it powers on or switches from using the analog system.
2. Power-down registration. The mobile station registers when it powers off if previously registered in the current serving system.
3. Timer-based registration. The mobile station registers when a timer expires.

- 1     4. Distance-based registration. The mobile station registers when the distance  
2       between the current base station and the base station in which it last registered  
3       exceeds a threshold.
- 4     5. Zone-based registration. The mobile station registers when it enters a new zone.
- 5     6. Parameter-change registration. The mobile station registers when certain of its  
6       stored parameters change or when it enters a new system.
- 7     7. Ordered registration. The mobile station registers when the base station requests  
8       it.
- 9     8. Implicit registration. When a mobile station successfully sends an *Origination*  
10       *Message* or *Page Response Message*, the base station can infer the mobile station's  
11       location. This is considered an implicit registration.
- 12    9. Traffic Channel registration. Whenever the base station has registration  
13       information for a mobile station that has been assigned to a Traffic Channel, the  
14       base station can notify the mobile station that it is registered.

15    The first five forms of registration, as a group, are called autonomous registration and are  
16    enabled by roaming status (see 6.6.5.3). Parameter-change registration is independent of  
17    roaming status. Ordered registration is initiated by the base station through an *Order*  
18    *Message*. Implicit registration does not involve the exchange of any registration messages  
19    between the base station and the mobile station. While a mobile station is assigned a  
20    Traffic Channel, the base station can obtain registration information by using the *Status*  
21    *Request Order* to obtain *Status Messages* from the mobile station. The mobile station can  
22    be notified that it is registered through the *Mobile Station Registered Message*.

23    Any of the various forms of autonomous registration and parameter-change registration can  
24    be enabled or disabled. The forms of registration that are enabled and the corresponding  
25    registration parameters are communicated in the *System Parameters Message*.

26    In addition, the mobile station may enable or disable autonomous registration for each type  
27    of roaming described in 6.6.5.3.

#### 28    6.6.5.1.1 Power-Up Registration

29    Power-up registration is performed when the mobile station is turned on. To prevent  
30    multiple registrations when power is quickly turned on and off, the mobile station delays  
31    T<sub>57m</sub> seconds before registering after entering the *Mobile Station Idle State*.

32    The mobile station shall maintain a power-up/initialization timer. While the power-  
33    up/initialization timer is active, the mobile station shall not make registration access  
34    attempts.

#### 35    6.6.5.1.2 Power-Down Registration

36    Power-down registration is performed when the user directs the mobile station to power off.  
37    If power-down registration is performed, the mobile station does not power down until after  
38    completing the registration attempt.

- 1 The mobile station does not perform power down registration if it has not previously  
2 registered in the system that corresponds to the current SID<sub>s</sub> and NID<sub>s</sub> (see 6.6.5.5.2.4).

### 3 6.6.5.1.3 Timer-Based Registration

- 4 Timer-based registration causes the mobile station to register at regular intervals. Its use  
5 also allows the system to automatically deregister mobile stations that did not perform a  
6 successful power-down registration. Timer-based registration uses a Paging Channel slot  
7 counter (equivalent to a timer with time increments of 80 ms). Timer-based registration is  
8 performed when the counter reaches a maximum value (REG\_COUNT\_MAX<sub>s</sub>) that is  
9 controlled by the base station via the REG\_PRD field of the *System Parameters Message*.  
10 The base station disables timer-based registration by setting REG\_PRD to zero.

- 11 The counter is reset on power-up and when switching from analog or alternate serving  
12 systems. The counter is also reset after each successful or implicit registration.

- 13 The mobile station shall maintain a timer-based registration counter (REG\_COUNT<sub>s</sub>). The  
14 mobile station shall compute and store the timer expiration count (REG\_COUNT\_MAX<sub>s</sub>) as

$$15 \text{ REG\_COUNT\_MAX}_s = \lfloor 2^{\text{REG\_PRD}/4} \rfloor$$

- 16 The mobile station shall maintain an indicator of timer-based registration timer enable  
17 status (COUNTER\_ENABLED<sub>s</sub>).

- 18 Whenever the mobile station changes COUNTER\_ENABLED<sub>s</sub> from NO to YES, it shall set  
19 REG\_COUNT<sub>s</sub> to a pseudorandom value between 0 and REG\_COUNT\_MAX<sub>s</sub> - 1, using the  
20 pseudorandom number generator specified in 6.6.7.2.

- 21 If the mobile station is operating in the non-slotted mode, it shall increment the timer-  
22 based registration counter once per 80 ms whenever COUNTER\_ENABLED<sub>s</sub> equals YES. If  
23 the mobile station is operating in slotted mode, it may increment the timer-based  
24 registration counter when it begins to monitor the Paging Channel. A mobile station  
25 operating in the slotted mode shall increment the counter by the same amount that the  
26 counter would have been incremented if the mobile station had been operating in the non-  
27 slotted mode.<sup>18</sup>

### 28 6.6.5.1.4 Distance-Based Registration

- 29 Distance-based registration causes a mobile station to register when the distance between  
30 the current base station and the base station in which it last registered exceeds a  
31 threshold. The mobile station determines that it has moved a certain distance by  
32 computing a distance measure based on the difference in latitude and longitude between  
33 the current base station and the base station where the mobile station last registered. If  
34 this distance measure exceeds the threshold value, the mobile station registers.

- 35 The mobile station stores the base station latitude (BASE\_LAT\_REG<sub>s-p</sub>), the base station  
36 longitude (BASE\_LONG\_REG<sub>s-p</sub>) and the registration distance (REG\_DIST\_REG<sub>s-p</sub>), of the  
37 base station whose Access Channel was used for the mobile station's last registration (see

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<sup>18</sup>For example, if the mobile station uses a 2.56 second slot cycle, then it may increment the counter by 32 every time it becomes active.

- 1 6.3.4). The mobile station shall compute the current base station's distance from the last  
2 registration point (DISTANCE) as:

$$3 \quad \text{DISTANCE} = \left\lfloor \frac{\sqrt{(\Delta\text{lat})^2 + (\Delta\text{long})^2}}{16} \right\rfloor$$

- 4 where

$$5 \quad \Delta\text{lat} = \text{BASE\_LAT}_s - \text{BASE\_LAT\_REG}_{s-p}$$

$$6 \quad \Delta\text{long} = (\text{BASE\_LONG}_s - \text{BASE\_LONG\_REG}_{s-p}) \times \cos(\pi/180 \times \text{BASE\_LAT\_REG}_{s-p}/14400).$$

- 7 The mobile station shall compute DISTANCE with an error of no more than  $\pm 5\%$  of its true  
8 value when  $|\text{BASE\_LAT\_REG}_{s-p}/14400|$  is less than 60 and with an error of no more than  
9  $\pm 7\%$  of its true value when  $|\text{BASE\_LAT\_REG}_{s-p}/14400|$  is between 60 and 70.<sup>19</sup>

#### 10 6.6.5.1.5 Zone-Based Registration

- 11 Zones are groups of base stations within a given system and network. A base station's zone  
12 assignment is identified by the REG\_ZONE field of the *System Parameters Message*.

- 13 Zone-based registration causes a mobile station to register whenever it moves into a new  
14 zone not on its internally stored list of visited registration zones. A zone is added to the list  
15 whenever a registration (including implicit registration) occurs, and is deleted upon  
16 expiration of a timer. After a system access, timers are enabled for every zone except one  
17 that was successfully registered by the access. Timers are also enabled at the start of a  
18 call.

- 19 A mobile station can be registered in more than one zone. Zones are uniquely identified by  
20 a zone number (REG\_ZONE) plus the SID and NID of the zone.

- 21 The mobile station shall store a list of the zones in which the mobile station has registered  
22 (ZONE\_LIST<sub>s</sub>). Each entry in ZONE\_LIST<sub>s</sub> shall include the zone number (REG\_ZONE) and  
23 the (SID, NID) pair for the zone. The mobile station shall be capable of storing at least N<sub>zm</sub>  
24 entries in ZONE\_LIST<sub>s</sub>. A base station shall be considered to be in ZONE\_LIST<sub>s</sub> only if the  
25 base station's REG\_ZONE, SID and NID are found in an entry in ZONE\_LIST<sub>s</sub>. The mobile  
26 station provides storage for one entry of ZONE\_LIST<sub>s</sub> in semi-permanent memory.  
27 ZONE\_LIST<sub>s-p</sub> (see 6.3.4).

- 28 The mobile station shall maintain a zone list entry timer for each entry in ZONE\_LIST<sub>s</sub>.  
29 When an entry in ZONE\_LIST<sub>s</sub> is removed from the list, the corresponding zone list entry  
30 timer shall be disabled. The timer duration shall be as determined from the stored value of  
31 ZONE\_TIMER<sub>s</sub> using Table 7.7.2.3.2.1-1. The mobile station shall provide a means to  
32 examine each timer's value while the timer is active, so that the age of list entries can be  
33 compared.

- 34 The base station controls the maximum number of zones in which a mobile station may be  
35 considered registered, by means of the TOTAL\_ZONES field of the *System Parameters*  
36 *Message*. When an entry is added to the zone list, or if TOTAL\_ZONES is decreased, the

---

<sup>19</sup>BASE\_LAT and BASE\_LONG are given in units of 1/4 seconds. BASE\_LAT/14400 and  
BASE\_LONG/14400 are in units of degrees.

1 mobile station removes entries from the zone list if there are more entries than allowed by  
2 the setting of TOTAL\_ZONES.

3 Whenever ZONE\_LIST<sub>s</sub> contains more than TOTAL\_ZONES<sub>s</sub> entries, the mobile station shall  
4 delete the excess entries according to the following rules:

- 5 • If TOTAL\_ZONES<sub>s</sub> is equal to zero, the mobile station shall delete all entries.
- 6 • If TOTAL\_ZONES<sub>s</sub> is not equal to zero, the mobile station shall delete those entries  
7 having active zone list entry timers, starting with the oldest entry, as determined by  
8 the timer values, and continuing in order of decreasing age until no more than  
9 TOTAL\_ZONES<sub>s</sub> entries remain.

10 The mobile station shall store a list of the systems/networks in which the mobile station  
11 has registered (SID\_NID\_LIST<sub>s</sub>). Each entry in SID\_NID\_LIST<sub>s</sub> shall include the (SID, NID)  
12 pair for the system/network. The mobile station shall be capable of storing N<sub>10m</sub> entries in  
13 SID\_NID\_LIST<sub>s</sub>. A base station shall be considered to be in the SID\_NID\_LIST<sub>s</sub> only if the  
14 base station's SID and NID are found in an entry in SID\_NID\_LIST<sub>s</sub>. The mobile station  
15 shall provide storage for one entry of SID\_NID\_LIST<sub>s</sub> in semi-permanent memory  
16 (SID\_NID\_LIST<sub>s-p</sub>).

17 The mobile station shall maintain a SID/NID list entry timer for each entry in  
18 SID\_NID\_LIST<sub>s</sub>. When an entry in SID\_NID\_LIST<sub>s</sub> is removed from the list, the  
19 corresponding SID/NID list entry timer shall be disabled. The timer duration shall be as  
20 determined from the stored value of ZONE\_TIMER<sub>s</sub> using Table 7.7.2.3.2.1-1. The mobile  
21 station shall provide a means to examine each timer's value while the timer is active, so  
22 that the age of list entries can be compared.

23 Whenever SID\_NID\_LIST<sub>s</sub> contains more than N<sub>10m</sub> entries, the mobile station shall delete  
24 the excess entries according to the following rule:

- 25 • The mobile station shall delete those entries having active SID/NID list entry timers,  
26 starting with the oldest entry, as determined by the timer values, and continuing in  
27 order of decreasing age.

28 Whenever MULT\_SIDS<sub>s</sub> is equal to '0' and SID\_NID\_LIST contains entries with different  
29 SIDs, the mobile station shall delete the excess entries according to the following rules:

- 30 • If the SID/NID entry timer for any entry is disabled, the mobile station shall delete all  
31 entries not having the same SID as the entry whose timer is disabled;
- 32 • Otherwise, the mobile station shall delete all entries not having the same SID as the  
33 newest entry in SID\_NID\_LIST, as determined by the timer values.

34 Whenever MULT\_NIDS<sub>s</sub> is equal to '0' and SID\_NID\_LIST contains more than one entry for  
35 any SID, the mobile station shall delete the excess entries for each SID according to the  
36 following rules:

- 37 • If the SID/NID entry timer for any entry is disabled, the mobile station shall delete all  
38 entries for that SID except the entry whose timer is disabled;
- 39 • For all other SIDs, the mobile station shall delete all entries for each SID except the  
40 newest entry, as determined by the timer values.

1 6.6.5.1.6 Parameter-Change Registration

2 Parameter-change registration is performed when a mobile station modifies any of the  
3 following stored parameters:

- 4 • The preferred slot cycle index (SLOT\_CYCLE\_INDEX<sub>p</sub>)
- 5 • The station class mark (SCM<sub>p</sub>)
- 6 • The call termination enabled indicators (MOB\_TERM\_HOME<sub>p</sub>,  
7 MOB\_TERM\_FOR\_SID<sub>p</sub>, and MOB\_TERM\_FOR\_NID<sub>p</sub>)

8 Parameter-change registration is performed whenever there is no entry in the mobile  
9 station's SID\_NID\_LIST<sub>s</sub> that matches the base station's SID and NID.

10 Parameter-change registration is independent of the roaming status of the mobile station.<sup>20</sup>

11 Whenever a parameter changes, the mobile station shall delete all entries from  
12 SID\_NID\_LIST<sub>s</sub>.

13 6.6.5.1.7 Ordered Registration

14 The base station can command the mobile station to register by sending a *Registration*  
15 *Request Order*. Ordered registration is performed in the *Mobile Station Order and Message*  
16 *Processing Operation* (6.6.2.4). Requirements are specified in 6.6.5.5.2.3.

17 6.6.5.1.8 Implicit Registration

18 Whenever an *Origination Message* or *Page Response Message* is sent, the base station can  
19 infer the location of the mobile station. This is considered an implicit registration.  
20 Requirements are specified in 6.6.5.5.3.

21 6.6.5.1.9 Traffic Channel Registration

22 While a mobile station is assigned a Traffic Channel, the mobile station is notified that it is  
23 registered through the *Mobile Station Registered Message*. Requirements are specified in  
24 6.6.5.5.4.3.

25 6.6.5.2 Systems and Networks

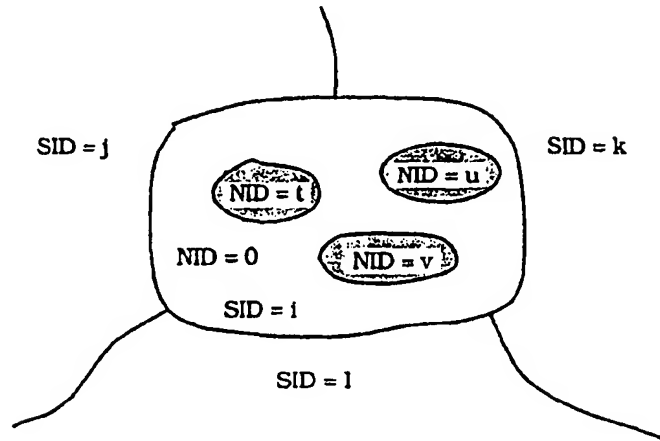
26 A base station is a member of a cellular system and a network. A network is a subset of a  
27 system.

28 Systems are labeled with an identification called the system identification or SID; networks  
29 within a system are given a network identification or NID. A network is uniquely identified  
30 by the pair (SID, NID). The SID number 0 is a reserved value. The NID number 0 is a  
31 reserved value indicating all base stations that are not included in a specific network. The  
32 NID number 65535 ( $2^{16}-1$ ) is a reserved value the mobile station may use for roaming  
33 status determination (see 6.6.5.3) to indicate that the mobile station considers the entire  
34 SID (regardless of NID) as home (non-roaming).

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<sup>20</sup>The indicator REG\_ENABLED does not govern parameter-change registration.

- 1 Figure 6.6.5.2-1 shows an example of systems and networks. SID i contains three  
 2 networks labeled t, u, and v. A base station in system i that is not in one of these three  
 3 networks is in NID 0.  
 4



5  
 6 **Figure 6.6.5.2-1. Systems and Networks Example**  
 7

#### 8 6.6.5.3 Roaming

9 The mobile station has a list of one or more home (non-roaming) (SID, NID) pairs. A mobile  
 10 station is roaming if the stored (SID<sub>s</sub>, NID<sub>s</sub>) pair (received in the *System Parameters*  
 11 *Message*) does not match one of the mobile station's non-roaming (SID, NID) pairs. Two  
 12 types of roaming are defined: A mobile station is a foreign NID roamer if the mobile station  
 13 is roaming and there is some (SID, NID) pair in the mobile station's (SID, NID) list for which  
 14 SID is equal to SID<sub>s</sub>. A mobile station is a foreign SID roamer if there is no (SID, NID) pair  
 15 in the mobile station's (SID, NID) list for which SID is equal to SID<sub>s</sub>.<sup>21</sup> The mobile station  
 16 may use the special NID value 65535 to indicate that the mobile station considers all NIDs  
 17 within a SID to be non-roaming (i.e., that the mobile station is not roaming when operating  
 18 with any base station in that system).

19 The mobile station shall store three 1-bit parameters in its permanent memory (see 6.3.8).  
 20 These parameters are MOB\_TERM\_HOME<sub>p</sub>, MOB\_TERM\_FOR\_SID<sub>p</sub>, and MOB\_TERM-  
 21 \_FOR\_NID<sub>p</sub>. The mobile station shall set MOB\_TERM\_HOME<sub>p</sub> to '1' if the mobile station is  
 22 configured to receive mobile station terminated calls when using a home (SID, NID) pair;  
 23 otherwise MOB\_TERM\_HOME<sub>p</sub> shall be set to '0'. The mobile station shall set MOB\_TERM-

<sup>21</sup>For example, suppose a mobile station has the following SID, NID list (2, 3) (2, 0) (3, 1). If the base station (SID, NID) pair is (2, 3) then the mobile station is not roaming because the (SID, NID) pair is in the list. If the base station (SID, NID) pair is (2, 7) then the mobile station is a foreign NID roamer because the SID 2 is in the list, but the (SID, NID) pair (2, 7) is not in the list. If the base station (SID, NID) pair is (4, 0) then the mobile station is a foreign SID roamer because SID 4 is not in the list.

1   FOR\_SID<sub>p</sub> to '1' if the mobile station is configured to receive mobile station terminated  
 2   calls when it is a foreign SID roamer; otherwise MOB\_TERM\_FOR\_SID<sub>p</sub> shall be set to '0'.  
 3   The mobile station shall set MOB\_TERM\_FOR\_NID<sub>p</sub> to '1' if the mobile station is configured  
 4   to receive mobile station terminated calls when it is a foreign NID roamer; otherwise  
 5   MOB\_TERM\_FOR\_NID<sub>p</sub> shall be set to '0'.

6   The mobile station determines the registration status using these parameters and the  
 7   HOME\_REG, FOR\_NID\_REG, and FOR\_SID\_REG fields of the *System Parameters Message*.

8   The mobile station shall store a mobile station call termination enabled indicator,  
 9   MOB\_TERM<sub>s</sub>. The mobile station shall set MOB\_TERM<sub>s</sub> to YES if any of the following  
 10   conditions is met; otherwise MOB\_TERM<sub>s</sub> shall be set to NO:

- 11     • The mobile station is not roaming, and MOB\_TERM\_HOME<sub>p</sub> is equal to '1'; or
- 12     • The mobile station is a foreign NID roamer and MOB\_TERM\_FOR\_NID<sub>p</sub> is equal to '1';
- 13       or
- 14     • The mobile station is a foreign SID roamer and MOB\_TERM\_FOR\_SID<sub>p</sub> is equal to '1'.

15   The mobile station shall store a registration status indicator, REG\_ENABLED<sub>s</sub>. The  
 16   indicator REG\_ENABLED<sub>s</sub> shall be set to YES if any of the following conditions is met for  
 17   the mobile station; otherwise REG\_ENABLED<sub>s</sub> shall be set to NO:

- 18     • The mobile station is not roaming, and both HOME\_REG<sub>s</sub> and MOB\_TERM\_HOME<sub>p</sub>  
 19       are equal to '1'; or
- 20     • The mobile station is a foreign NID roamer and both FOR\_NID\_REG<sub>s</sub> and  
 21       MOB\_TERM\_FOR\_NID<sub>p</sub> are equal to '1'; or
- 22     • The mobile station is a foreign SID roamer and both FOR\_SID\_REG<sub>s</sub> and  
 23       MOB\_TERM\_FOR\_SID<sub>p</sub> are equal to '1'.

24   The mobile station performs autonomous registrations if REG\_ENABLED<sub>s</sub> is YES.

#### 25   6.6.5.4 Registration Timers and Indicators

26   The mobile station shall provide the following registration timers:

- 27     • Power-up/initialization timer (see 6.6.5.1.1).
- 28     • Timer-based registration timer (see 6.6.5.1.3).
- 29     • Zone list entry timers (see 6.6.5.1.5).
- 30     • SID/NID list entry timers (see 6.6.5.1.5).

31   The mobile station shall provide a means of enabling and disabling each timer. When a  
 32   timer is disabled, it shall not be considered expired. A timer that has been enabled is  
 33   referred to as active.



1    6.6.5.5 Registration Procedures

2    6.6.5.5.1 Actions in the *Mobile Station Initialization State*.

3    6.6.5.5.1.1 Power-up or Serving System Change

4    Upon power-up, the mobile station shall perform the following actions:

- 5       • Delete all entries of ZONE\_LIST<sub>s</sub>.
- 6       • If ZONE\_LIST<sub>s-p</sub> contains an entry, copy the entry to ZONE\_LIST<sub>s</sub> and disable the
- 7           corresponding entry timer.
- 8       • Delete all entries of SID\_NID\_LIST<sub>s</sub>.
- 9       • If SID\_NID\_LIST<sub>s-p</sub> contains an entry, copy the entry to SID\_NID\_LIST<sub>s</sub> and disable
- 10           the corresponding entry timer.
- 11       • Set the registered flag (REGISTERED<sub>s</sub>) to NO.

12    Upon power-up or after switching from analog or the alternate CDMA serving system, the

13    mobile station shall perform the following actions:

- 14       • Set timer-based registration enable status (COUNTER\_ENABLED<sub>s</sub>) to NO.
- 15       • Set autonomous registration enable status (REG\_ENABLED<sub>s</sub>) to NO.

16    6.6.5.5.1.2 Timer Maintenance

17    While in the *Mobile Station Initialization State*, the mobile station shall update all active

18    registration timers (see 6.6.5.4). If any timer expires while in this state, the mobile station

19    shall preserve the expiration status so that further action can be taken in the *Mobile Station*

20    *Idle State*.

21    6.6.5.5.1.3 Entering the *Mobile Station Idle State*

22    Before entering the *Mobile Station Idle State* from the *Mobile Station Initialization State*, the

23    mobile station shall

- 24       • If REGISTERED<sub>s</sub> is equal to NO, enable the power-up/initialization timer with an
- 25           expiration time of T<sub>57m</sub> seconds (see 6.6.5.1.1).

26    6.6.5.5.2 Actions in the *Mobile Station Idle State*

27    Requirements in this section and its subsections apply only when the mobile station is in

28    the *Mobile Station Idle State*.

29    6.6.5.5.2.1 Idle Registration Procedures

30    These procedures are performed whenever the mobile station is in the *Mobile Station Idle*

31    *State* (see 6.6.2.1.3).

32    While in the *Mobile Station Idle State*, the mobile station shall update all active registration

33    timers (see 6.6.5.4).

- 1 If the power-up/initialization timer has expired or is disabled, the mobile station shall  
2 perform the following actions in the order given. If any action necessitates a registration,  
3 the mobile station shall enter the *Update Overhead Information Substate* of the *System*  
4 *Access State* (see 6.6.3) with a registration indication.
- 5 1. The timer-based registration timer shall be enabled (COUNTER\_ENABLED<sub>s</sub> = YES)  
6 and the timer count (REG\_COUNT<sub>s</sub>) shall be set to a pseudorandom number as  
7 specified in 6.6.5.1.3, if the following conditions are met:
    - 8 a. COUNTER\_ENABLED<sub>s</sub> is equal to NO; and
    - 9 b. The stored configuration parameters are current (see 6.6.2.2); and
    - 10 c. REG\_ENABLED<sub>s</sub> is equal to YES; and
    - 11 d. REG\_PRD<sub>s</sub> is not equal to zero.
  - 12 2. If any zone list entry timer (see 6.6.5.1.5) has expired, the mobile station shall  
13 delete the corresponding entry from ZONE\_LIST<sub>s</sub>.
  - 14 3. If any SID/NID list entry timer (see 6.6.5.1.5) has expired, the mobile station shall  
15 delete the corresponding entry from SID\_NID\_LIST<sub>s</sub>.
  - 16 4. The mobile station shall perform power-up registration, as specified in 6.6.5.1.1, if  
17 all the following conditions are met:
    - 18 a. POWER\_UP\_REG<sub>s</sub> is equal to '1'; and
    - 19 b. The stored configuration parameters are current (see 6.6.2.2); and
    - 20 c. REGISTERED<sub>s</sub> is equal to NO, and
    - 21 d. REG\_ENABLED<sub>s</sub> is equal to YES.
  - 22 5. The mobile station shall perform parameter-change registration (see 6.6.5.1.6) if all  
23 the following conditions are met:
    - 24 a. PARAMETER\_REG<sub>s</sub> is equal to '1'; and
    - 25 b. The stored configuration parameters are current (see 6.6.2.2); and
    - 26 c. There is no entry of SID\_NID\_LIST<sub>s</sub> whose SID and NID fields match the stored  
27 SID<sub>s</sub> and NID<sub>s</sub>.
  - 28 6. The mobile station shall perform timer-based registration (see 6.6.5.1.3) if all the  
29 following conditions are met:
    - 30 a. COUNTER\_ENABLED<sub>s</sub> is equal to YES; and
    - 31 b. The stored configuration parameters are current (see 6.6.2.2); and
    - 32 c. REG\_ENABLED<sub>s</sub> is equal to YES; and
    - 33 d. REG\_COUNT<sub>s</sub> is greater than or equal to REG\_COUNT\_MAX<sub>s</sub>.
  - 34 7. The mobile station shall perform distance-based registration (see 6.6.5.1.4) if all the  
35 following conditions are met:
    - 36 a. REG\_DIST<sub>s</sub> is not equal to zero; and

- 1       b. The stored configuration parameters are current (see 6.6.2.2); and
- 2       c. REG\_ENABLED<sub>s</sub> is equal to YES; and
- 3       d. The current base station's distance from the base station in which the mobile
- 4             station last registered (see 6.6.5.1.4) is greater than or equal to
- 5             REG\_DIST\_REG<sub>s-p</sub>.
- 6    8. The mobile station shall perform zone-based registration (see 6.6.5.1.5) if all the
- 7       following conditions are met:
- 8       a. TOTAL\_ZONES<sub>s</sub> is not equal to zero; and
- 9       b. The stored configuration parameters are current (see 6.6.2.2); and
- 10      c. REG\_ENABLED<sub>s</sub> is equal to YES; and
- 11      d. There is no entry of ZONE\_LIST<sub>s</sub> whose SID, NID and REG\_ZONE fields match
- 12         the stored SID<sub>s</sub>, NID<sub>s</sub> and REG\_ZONE<sub>s</sub>.

#### 13   6.6.5.5.2.2 Processing the Registration Fields of the *System Parameters Message*

14   When the mobile station processes the *System Parameters Message*, it shall perform the

15   following actions:

- 16      1. If REG\_PRD<sub>s</sub> is equal to zero, the mobile station shall set COUNTER\_ENABLED<sub>s</sub> to
- 17         NO.
- 18      2. If REG\_PRD<sub>s</sub> is not equal to zero, the mobile station shall set REG\_COUNT\_MAX<sub>s</sub>
- 19         as specified in 6.6.5.1.3.
- 20      3. The mobile station shall update its roaming status and set REG\_ENABLED<sub>s</sub> as
- 21         specified in 6.6.5.3.
- 22      4. If ZONE\_LIST<sub>s</sub> contains more than TOTAL\_ZONES<sub>s</sub> entries, the mobile station shall
- 23         delete the excess entries according to the rules specified in 6.6.5.1.5.
- 24      5. If MULT\_SIDS<sub>s</sub> is equal to '0' and SID\_NID\_LIST contains entries with different
- 25         SIDs, delete the excess entries according to the rules specified in 6.6.5.1.5.
- 26      6. If MULT\_NIDS<sub>s</sub> is equal to '0' and SID\_NID\_LIST contains more than one entry for
- 27         any SID, delete the excess entries according to the rules specified in 6.6.5.1.5.

#### 28   6.6.5.5.2.3 Ordered Registration

29   Ordered registration is performed after receiving a *Registration Request Order* while in the

30   *Mobile Station Order and Message Processing Operation* (see 6.6.2.4).

31   The mobile station shall enter the *Update Overhead Information Substate* of the *System*

32   *Access State* with a registration indication within T<sub>33m</sub> seconds after the *Registration*

33   *Request Order* is received.

#### 34   6.6.5.5.2.4 Power Down

35   These procedures are performed when the mobile station is directed by the user to power

36   down.

- 1 The mobile station shall perform the following actions:
- 2 • If an entry of  $ZONE\_LIST_s$  does not have an active timer, copy that entry to
  - 3  $ZONE\_LIST_{s-p}$ ; otherwise, delete any entry in  $ZONE\_LIST_{s-p}$ .
  - 4 • If an entry of  $SID\_NID\_LIST_s$  does not have an active timer, copy that entry to
  - 5  $SID\_NID\_LIST_{s-p}$ ; otherwise, delete any entry in  $SID\_NID\_LIST_{s-p}$ .
- 6 The mobile station shall perform power-down registration, as specified in 6.6.5.1.2, if all the
- 7 following conditions are met:
- 8 •  $REG\_ENABLED_s$  equals YES; and
  - 9 •  $POWER\_DOWN\_REG_s$  equals '1'; and
  - 10 • There is an entry of  $SID\_NID\_LIST_s$  for which the SID and NID fields are equal to
  - 11  $SID_s$  and  $NID_s$ ; and
  - 12 • The power-up/initialization timer (see 6.6.5.1.1) is disabled or has expired.
- 13 6.6.5.5.3 Actions in the *System Access State*
- 14 Requirements in this section and its subsections apply only when the mobile station is in
- 15 the *System Access State*.
- 16 6.6.5.5.3.1 Successful Access, Registration, or Implicit Registration
- 17 These procedures shall be performed after the mobile station receives an acknowledgement
- 18 for a *Registration Message*, *Origination Message*, or *Page Response Message* sent on the
- 19 Access Channel (see 6.6.3.1.2).
- 20 • Disable the power-up/initialization timer (see 6.6.5.1.1).
  - 21 • Set the First-Idle ID status to enabled (see 2.6.3.1.1).
  - 22 • Set  $REG\_COUNT_s$  to zero.
  - 23 • Set  $REGISTERED_s$  to YES.
  - 24 • Delete from  $ZONE\_LIST_s$  all entries that have a SID from a different serving system
  - 25 than  $SERVSYS_s$ .
  - 26 • Add  $REG\_ZONE_s$ ,  $SID_s$ , and  $NID_s$  to  $ZONE\_LIST_s$  if not already in the list.
  - 27 • Disable the zone list entry timer for the entry of  $ZONE\_LIST_s$  containing  $REG\_ZONE_s$ ,
  - 28  $SID_s$ , and  $NID_s$ . For any other entry of  $ZONE\_LIST_s$  whose entry timer is not active,
  - 29 enable the entry timer with the duration specified by  $ZONE\_TIMER_s$  (see 6.6.5.1.5).
  - 30 • If  $ZONE\_LIST_s$  contains more than  $TOTAL\_ZONES_s$  entries, delete the excess entries
  - 31 according to the rules specified in 6.6.5.1.5.
  - 32 • Delete from  $SID\_NID\_LIST_s$  all entries that have a SID from a different serving system
  - 33 than  $SERVSYS_s$ .
  - 34 • Add  $SID_s$  and  $NID_s$  to  $SID\_NID\_LIST_s$  if not already in the list.

- 1     • Disable the SID/NID list entry timer for the entry of  $SID\_NID\_LIST_s$  containing  $SID_s$ ,  
2       and  $NID_s$ . For any other entry of  $SID\_NID\_LIST_s$  whose entry timer is not active,  
3       enable the entry timer with the duration specified in 6.6.5.1.5.
- 4     • If  $SID\_NID\_LIST_s$  contains more than  $N_{10m}$  entries, delete the excess entries  
5       according to the rules specified in 6.6.5.1.5.
- 6     • If  $MULT\_SIDS_s$  is equal to '0' and  $SID\_NID\_LIST$  contains entries with different SIDs,  
7       delete the excess entries according to the rules specified in 6.6.5.1.5.
- 8     • If  $MULT\_NIDS_s$  is equal to '0' and  $SID\_NID\_LIST$  contains more than one entry for  
9       any SID, delete the excess entries according to the rules specified in 6.6.5.1.5.
- 10    • Set the stored location of last registration ( $BASE\_LAT\_REG_{s-p}$  and  $BASE\_LONG\_REG_{s-p}$ ) to the current base station's location ( $BASE\_LAT_s$  and  $BASE\_LONG_s$ ). Set  
11      the stored registration distance ( $REG\_DIST\_REG_{s-p}$ ) to the current base station's  
12      registration distance ( $REG\_DIST_s$ ).  
13
- 14    These procedures shall be performed after the mobile station receives an acknowledgement  
15      for any other message:
  - 16       • Set the First-Idle ID status to enabled (see 2.6.3.11).
  - 17       • Delete from  $ZONE\_LIST_s$  all entries that have a SID from a different serving system  
18       than  $SERVSYS_s$ .
  - 19       • For any entry of  $ZONE\_LIST_s$  not matching  $REG\_ZONE_s$ ,  $SID_s$ , and  $NID_s$  and not  
20       having an active entry timer, enable the entry timer with the duration specified by  
21        $ZONE\_TIMER_s$  (see 6.6.5.1.5).
  - 22       • Delete from  $SID\_NID\_LIST_s$  all entries that have a SID from a different serving system  
23       than  $SERVSYS_s$ .
  - 24       • For any entry of  $SID\_NID\_LIST_s$  not matching  $SID_s$  and  $NID_s$  and not having an  
25       active entry timer, enable the entry timer with the duration specified by  
26        $ZONE\_TIMER_s$  (see 6.6.5.1.5).

#### 27    6.6.5.5.3.2 Unsuccessful Access

28    These procedures are performed when an access attempt fails or the mobile station declares  
29    a loss of the Paging Channel when in the System Access State (see 6.4.3).

30    The mobile station shall perform the following actions:

- 31    • Set the First-Idle ID status to enabled (see 2.6.3.11).
- 32    • Delete from  $ZONE\_LIST_s$  all entries that have a SID from a different serving system  
33    than  $SERVSYS_s$ .
- 34    • For any entry of  $ZONE\_LIST_s$  not matching  $REG\_ZONE_s$ ,  $SID_s$ , and  $NID_s$  and not  
35    having an active entry timer, enable the entry timer with the duration specified by  
36     $ZONE\_TIMER_s$  (see 6.6.5.1.5).
- 37    • Delete from  $SID\_NID\_LIST_s$  all entries that have a SID from a different serving system  
38    than  $SERVSYS_s$ .

- 1     • For any entry of  $SID\_NID\_LIST_s$  not matching  $SID_s$  and  $NID_s$  and not having an
- 2       active entry timer, enable the entry timer with the duration specified by
- 3        $ZONE\_TIMER_s$  (see 6.6.5.1.5).

#### 4     6.6.5.5.3.3 Power Down

5     These procedures are performed when the mobile station is directed by the user to power

6     down.

7     The mobile station shall perform the following actions:

- 8       • If an entry of  $ZONE\_LIST_s$  does not have an active timer, copy that entry to
- 9          $ZONE\_LIST_{s-p}$ ; otherwise, delete any entry in  $ZONE\_LIST_{s-p}$ .
- 10      • If an entry of  $SID\_NID\_LIST_s$  does not have an active timer, copy that entry to
- 11        $SID\_NID\_LIST_{s-p}$ ; otherwise, delete any entry in  $SID\_NID\_LIST_{s-p}$ .

#### 12    6.6.5.5.4 Actions in the *Mobile Station Control on the Traffic Channel State*

13    Requirements in this section and its subsections apply only when the mobile station is in

14    the *Mobile Station Control on the Traffic Channel State*.

##### 15    6.6.5.5.4.1 Traffic Channel Initialization

16    Upon entering the *Traffic Channel Initialization Substate* of the *Mobile Station Control on the*

17    *Traffic Channel State*, the mobile station shall set  $COUNTER\_ENABLED_s$  to NO.

##### 18    6.6.5.5.4.2 Timer Maintenance

19    While in the *Mobile Station Control on the Traffic Channel State*, the mobile station shall

20    update all active registration timers.

21    If a zone list entry timer expires, the mobile station shall delete the corresponding entry

22    from  $ZONE\_LIST_s$ . If a  $SID/NID$  list entry timer expires, the mobile station shall delete the

23    corresponding entry from  $SID\_NID\_LIST_s$ .

##### 24    6.6.5.5.4.3 Processing the *Mobile Station Registered Message*

25    The mobile station receives the *Mobile Station Registered Message* on the Forward Traffic

26    Channel when the mobile station is considered registered for the base station whose

27    location and other parameters are included in the message.

28    The mobile station shall store the following parameters:

- 29      • System identification ( $SID_s = SID_r$ )
- 30      • Network identification ( $NID_s = NID_r$ )
- 31      • Registration zone ( $REG\_ZONE_s = REG\_ZONE_r$ )
- 32      • Number of registration zones to be retained ( $TOTAL\_ZONES_s = TOTAL\_ZONES_r$ )
- 33      • Zone timer length ( $ZONE\_TIMER_s = ZONE\_TIMER_r$ )
- 34      • Multiple SID storage indicator ( $MULT\_SIDS_s = MULT\_SIDS_r$ )
- 35      • Multiple NID storage indicator ( $MULT\_NIDS_s = MULT\_NIDS_r$ )

- Base station latitude ( $BASE\_LAT_s = BASE\_LAT_r$ )
- Base station longitude ( $BASE\_LONG_s = BASE\_LONG_r$ )
- Registration distance ( $REG\_DIST_s = REG\_DIST_r$ )

The mobile station shall perform the following actions:

- Set the First-Idle ID status to enabled (see 2.6.3.11).
- Add  $REG\_ZONE_s$ ,  $SID_s$ , and  $NID_s$  to  $ZONE\_LIST_s$  if not already in the list.
- Disable the zone list entry timer for the entry of  $ZONE\_LIST_s$  containing  $REG\_ZONE_s$ ,  $SID_s$ , and  $NID_s$ . For any other entry of  $ZONE\_LIST_s$  whose entry timer is not active, enable the entry timer with the duration specified by  $ZONE\_TIMER_s$  (see 6.6.5.1.5).
- If  $ZONE\_LIST_s$  contains more than  $TOTAL\_ZONES_s$  entries, delete the excess entries according to the rules specified in 6.6.5.1.5.
- Add  $SID_s$  and  $NID_s$  to  $SID\_NID\_LIST_s$  if not already in the list.
- Disable the SID/NID list entry timer for the entry of  $SID\_NID\_LIST_s$  containing  $SID_s$  and  $NID_s$ . For any other entry of  $SID\_NID\_LIST_s$  whose entry timer is not active, enable the entry timer with the duration specified in 6.6.5.1.5.
- If  $SID\_NID\_LIST_s$  contains more than  $N_{10m}$  entries, delete the excess entries according to the rules specified in 6.6.5.1.5.
- If  $MULT\_SIDS_s$  is equal to '0' and  $SID\_NID\_LIST$  contains entries with different SIDs, delete the excess entries according to the rules specified in 6.6.5.1.5.
- If  $MULT\_NIDS_s$  is equal to '0' and  $SID\_NID\_LIST$  contains more than one entry for any SID, delete the excess entries according to the rules specified in 6.6.5.1.5.
- Set the stored location of last registration ( $BASE\_LAT\_REG_{s-p}$  and  $BASE\_LONG\_REG_{s-p}$ ) to the base station's location ( $BASE\_LAT_s$  and  $BASE\_LONG_s$ ). Set the stored registration distance ( $REG\_DIST\_REG_{s-p}$ ) to the base station's registration distance ( $REG\_DIST_s$ ).
- Update its roaming status and set  $MOB\_TERM_s$  as specified in 6.6.5.3. The mobile station should indicate to the user whether the mobile station is roaming.

#### 6.6.5.5.4.4 Power Down

These procedures are performed when the mobile station is directed by the user to power down.

The mobile station shall perform the following actions:

- If an entry of  $ZONE\_LIST_s$  does not have an active timer, copy that entry to  $ZONE\_LIST_{s-p}$ ; otherwise, delete any entry in  $ZONE\_LIST_{s-p}$ .
- If an entry of  $SID\_NID\_LIST_s$  does not have an active timer, copy that entry to  $SID\_NID\_LIST_{s-p}$ ; otherwise, delete any entry in  $SID\_NID\_LIST_{s-p}$ .

## 6.6.6 Handoff Procedures

This section presents an overview and mobile station requirements for handoffs occurring while the mobile station is in the *Mobile Station Control on the Traffic Channel State* (see 6.6.4). Mobile station requirements for handoffs occurring while the mobile station is in the *Mobile Station Idle State* are specified in 6.6.2.1.4.

### 6.6.6.1 Overview

#### 6.6.6.1.1 Types of Handoff

The mobile station supports the following three handoff procedures while in the *Mobile Station Control on the Traffic Channel State*:

- **Soft Handoff:** A handoff in which the mobile station commences communications with a new base station without interrupting communications with the old base station. Soft handoff can only be used between CDMA Channels having identical frequency assignments. Soft handoff provides diversity of Forward Traffic Channels and Reverse Traffic Channel paths on the boundaries between base stations.
- **CDMA to CDMA Hard Handoff:** A handoff in which the mobile station is transitioned between disjoint sets of base stations, different frequency assignments, or different frame offsets.
- **CDMA to Analog Handoff:** A handoff in which the mobile station is directed from a Forward Traffic Channel to an analog voice channel.

#### 6.6.6.1.2 Pilot Sets

Within section 6.6.6 the term pilot refers to a Pilot Channel identified by a pilot sequence offset (see 7.1.3.2.1) and a frequency assignment (see 7.1.1.1). A pilot is associated with the Forward Traffic Channels in the same Forward CDMA Channel. All pilots in a pilot set have the same CDMA frequency assignment.

The mobile station searches for pilots on the current CDMA frequency assignment to detect the presence of CDMA Channels and to measure their strengths. When the mobile station detects a pilot of sufficient strength that is not associated with any of the Forward Traffic Channels assigned to it, it sends a *Pilot Strength Measurement Message* to the base station. The base station can then assign a Forward Traffic Channel associated with that pilot to the mobile station and direct the mobile station to perform a handoff.

The pilot search parameters and the rules for *Pilot Strength Measurement Message* transmission are expressed in terms of the following sets of pilots:

- **Active Set:** The pilots associated with the Forward Traffic Channels assigned to the mobile station.
- **Candidate Set:** The pilots that are not currently in the Active Set but have been received by the mobile station with sufficient strength to indicate that the associated Forward Traffic Channels could be successfully demodulated.
- **Neighbor Set:** The pilots that are not currently in the Active Set or the Candidate Set and are likely candidates for handoff.



- **Remaining Set:** The set of all possible pilots in the current system (integer multiples of  $\text{PILOT\_INC}_S$ ) on the current CDMA frequency assignment, excluding the pilots in the Neighbor Set, the Candidate Set, and the Active Set.

#### 6.6.6.2 Requirements

##### 6.6.6.2.1 Pilot Search

For the pilot sets defined in 6.6.6.1.2, the base station sets the search window (range of PN offsets) in which the mobile station is to search for usable multipath components (i.e., multipath components that the mobile station can use for demodulation of the associated Forward Traffic Channel) of the pilots in the set.

Search performance criteria are defined in IS-98 "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

This search shall be governed by the following:

- **Active Set and Candidate Set** The search procedures for pilots in the Active Set and Candidate Set shall be identical. The search window size<sup>22</sup> for each pilot in the Active Set and Candidate Set shall be the number of PN chips specified in Table 6.6.6.2.1-1 corresponding to  $\text{SRCH\_WIN\_A}_S$ . The mobile station should center the search window for each pilot of the Active Set and Candidate Set around the earliest arriving usable multipath component of the pilot. If the mobile station receives a value greater than or equal to 13 for  $\text{SRCH\_WIN\_A}_F$ , it may store and use the value 13 in  $\text{SRCH\_WIN\_A}_S$ .

Table 6.6.6.2.1-1. Searcher Window Sizes

$\text{SRCH\_WIN\_A}$ $\text{SRCH\_WIN\_N}$ $\text{SRCH\_WIN\_R}$	Window Size (PN chips)	$\text{SRCH\_WIN\_A}$ $\text{SRCH\_WIN\_N}$ $\text{SRCH\_WIN\_R}$	Window Size (PN chips)
0	4	8	60
1	6	9	80
2	8	10	100
3	10	11	130
4	14	12	160
5	20	13	226
6	28	14	320
7	40	15	452

<sup>22</sup>The table defines the entire search range. For example,  $\text{SRCH\_WIN\_A}_S = 6$  corresponds to a 28 PN chip search window or  $\pm 14$  PN chips around the search window center.

- 1 • *Neighbor Set*: The search window size for each pilot in the Neighbor Set shall be the  
2 number of PN chips specified in Table 6.6.6.2.1-1 corresponding to  $SRCH\_WIN\_N_s$ .  
3 The mobile station should center the search window for each pilot in the Neighbor  
4 Set around the pilot's PN sequence offset using timing defined by the mobile station's  
5 time reference (see 6.1.5.1).
- 6 • *Remaining Set*: The search window size for each pilot in the Remaining Set shall be  
7 the number of PN chips specified in Table 6.6.6.2.1-1 corresponding to  
8  $SRCH\_WIN\_R_s$ . The mobile station should center the search window for each pilot in  
9 the Remaining Set around the pilot's PN sequence offset using timing defined by the  
10 mobile station's time reference (see 6.1.5.1). The mobile station should only search  
11 for Remaining Set pilots whose pilot PN sequence offset indices are equal to integer  
12 multiples of  $PILOT\_INC_s$ .

#### 13 6.6.6.2.2 Pilot Strength Measurements

14 The mobile station assists the base station in the handoff process by measuring and  
15 reporting the strengths of received pilots.

16 The mobile station should use the searcher element (see 6.2.2.1) to compute the strength of  
17 a pilot by adding the ratios of received pilot energy per chip,  $E_c$ , to total received spectral  
18 density (noise and signals),  $I_0$ , of at most  $k$  usable multipath components, where  $k$  is the  
19 number of demodulating elements (see 6.2.2.1) supported by the mobile station.

#### 20 6.6.6.2.3 Handoff Drop Timer

21 The mobile station shall maintain a handoff drop timer for each pilot in the Active Set and  
22 Candidate Set. The mobile station shall start the timer whenever the strength of the  
23 corresponding pilot becomes less than  $T\_DROP_s$ . For the Active Set, the mobile station  
24 shall start the timer even if the timer has previously expired. The mobile station shall reset  
25 and disable the timer if the strength of the corresponding pilot exceeds  $T\_DROP_s$ . If  
26  $T\_TDROP_s$  equals zero, the mobile station shall consider the timer expired within 100 ms of  
27 enabling it. Otherwise, the mobile station shall consider the timer expired within 10% of  
28 the timer expiration value shown in Table 6.6.6.2.3.-1 corresponding to  $T\_TDROP_s$ . If  
29  $T\_TDROP_s$  changes, the mobile station shall begin using the new value for all handoff drop  
30 timers within 100 ms.

31

Table 6.6.6.2.3-1. Handoff Drop Timer Expiration Values

T_TDROP	Timer Expiration (seconds)	T_TDROP	Timer Expiration (seconds)
0	≤ 0.1	8	27
1	1	9	39
2	2	10	55
3	4	11	79
4	6	12	112
5	9	13	159
6	13	14	225
7	19	15	319

The mobile station shall indicate the status of the handoff drop timer for all pilots in the Active Set and Candidate Set when transmitting a *Pilot Strength Measurement Message*.

#### 6.6.6.2.4 Pilot PN Phase

The mobile station shall measure the arrival time, PILOT\_ARRIVAL, for each pilot reported to the base station. The pilot arrival time shall be the time of occurrence, as measured at the mobile station antenna connector, of the earliest arriving usable multipath component of the pilot. The arrival time shall be measured relative to the mobile station's time reference (see 6.1.5.1) in units of PN chips. The mobile station shall compute the reported pilot PN phase, PILOT\_PN\_PHASE, as

$$\text{PILOT\_PN\_PHASE} = (\text{PILOT\_ARRIVAL} + (64 \times \text{PILOT\_PN})) \bmod 2^{15},$$

where PILOT\_PN is the PN sequence offset index of the pilot (see 7.1.3.2.1).

#### 6.6.6.2.5 Handoff Messages

##### 6.6.6.2.5.1 Processing of Forward Traffic Channel Handoff Messages

If the mobile station receives any of the following messages, then the mobile station shall process the message as described.

1. Pilot Measurement Request Order: The mobile station shall send, within T<sub>56m</sub> seconds, a *Pilot Strength Measurement Message*.
2. Handoff Direction Message: The message shall take effect at the following time:
  - If FRAME\_OFFSET<sub>r</sub> is not equal to FRAME\_OFFSET<sub>s</sub> and USE\_TIME<sub>r</sub> equals '0', then the message shall take effect on the first 80 ms boundary (relative to System Time) occurring at least 80 ms after the end of the frame containing the last bit of the message.

- Otherwise, the message shall take effect at the action time of the message as specified in 6.6.4.1.5.
- If the ACK\_REQ field of the *Handoff Direction Message* is set to '1', the mobile station shall acknowledge the message before the message takes effect, unless there is insufficient time to transmit a message containing the acknowledgement before the message takes effect. Insufficient time is defined as an explicit action time shorter than the maximum implicit action time or too many outstanding messages remaining to be processed.

When the message takes effect, the mobile station shall perform the following:

- Update the Active Set, Candidate Set, and Neighbor Set in accordance with the *Handoff Direction Message* processing (see 6.6.6.2.6.1, 6.6.6.2.6.2, and 6.6.6.2.6.3).
- Discontinue use of all Forward Traffic Channels associated with pilots not listed in the *Handoff Direction Message*.
- If FRAME\_OFFSET<sub>r</sub> is not equal to FRAME\_OFFSET<sub>s</sub>, change the frame offset on both the Forward Traffic Channel and the Reverse Traffic Channel.
- If the RESET\_L2<sub>r</sub> is equal to '1', reset the acknowledgement procedures as specified in 6.6.4.1.3.3, and reset the Forward Traffic Channel power control counters as specified in 6.6.4.1.1.1. The acknowledgement procedures shall be reset immediately after the action time of the *Handoff Direction Message*.
- Use the long code mask specified by the PRIVATE\_LCM<sub>r</sub> (see 6.3.12.3) and indicate to the user the voice privacy mode status.
- Process the ENCRYPT\_MODE field as specified in 6.3.12.2.
- Set NUM\_PREAMBLE<sub>s</sub> = '000'.
- If CDMA\_FREQ<sub>r</sub> ≠ CDMA\_FREQ<sub>s</sub>, FRAME\_OFFSET<sub>r</sub> ≠ FRAME\_OFFSET<sub>s</sub>, or the set of pilots specified by the message is disjoint from the Active Set prior to the action time of the message, the mobile station shall perform actions as indicated in 6.6.6.2.8. If the message specifies more than one pilot, the mobile station shall perform actions as specified in 6.6.6.2.7.
- Store the following parameters from the *Handoff Direction Message*:
  - *Handoff Direction Message* sequence number (HDM\_SEQ<sub>s</sub> = HDM\_SEQ<sub>r</sub>)
  - Search window size for the Active Set and Candidate Set (SRCH\_WIN\_A<sub>s</sub> = SRCH\_WIN\_A<sub>r</sub>)
  - Pilot detection threshold (T\_ADD<sub>s</sub> = T\_ADD<sub>r</sub>)
  - Pilot drop threshold (T\_DROP<sub>s</sub> = T\_DROP<sub>r</sub>)
  - Active Set versus Candidate Set comparison threshold (T\_COMP<sub>s</sub> = T\_COMP<sub>r</sub>)
  - Drop timer value (T\_TDROPS = T\_TDROPR)
  - Frame offset (FRAME\_OFFSET<sub>s</sub> = FRAME\_OFFSET<sub>r</sub>)

- 1       - Frequency assignment, if specified  
2       (if  $FREQ\_INCL_r = '1'$ ,  $CDMACH_s = CDMA\_FREQ_r$ )
- 3       - One or more occurrences of  $PILOT\_PN$ ,  $PWR\_COMB\_IND$ , and  $CODE\_CHAN$   
4       for each included member of the active set.
- 5   3. Analog Handoff Direction Message: The mobile station shall process the message as  
6   specified in 6.6.6.2.9.
- 7   4. Neighbor List Update Message: The mobile station shall process the message as  
8   specified in 6.6.6.2.6.3.
- 9   5. Extended Handoff Direction Message: The message shall take effect at the following  
10   time:
  - 11   • If  $FRAME\_OFFSET$  is included and  $FRAME\_OFFSET_r$  is not equal to  
12    $FRAME\_OFFSET_s$  and  $USE\_TIME_r$  equals '0', then the message shall take effect  
13   on the first 80 ms boundary (relative to System Time) occurring at least 80 ms  
14   after the end of the frame containing the last bit of the message.
  - 15   • Otherwise, the message shall take effect at the action time of the message as  
16   specified in 6.6.4.1.5.
  - 17   • If the  $ACK\_REQ$  field of the *Extended Handoff Direction Message* is set to '1', the  
18   mobile station shall acknowledge the message before the message takes effect,  
19   unless there is insufficient time to transmit a message containing the  
20   acknowledgement before the message takes effect. Insufficient time is defined as  
21   an explicit action time shorter than the maximum implicit action time or too  
22   many outstanding messages remaining to be processed.
- 23   When the message takes effect, the mobile station shall perform the following:
  - 24   • Update the Active Set, Candidate Set, and Neighbor Set in accordance with the  
25   Extended Handoff Direction Message processing (see 6.6.6.2.6.1, 6.6.6.2.6.2,  
26   and 6.6.6.2.6.3).
  - 27   • Discontinue use of all Forward Traffic Channels associated with pilots not listed  
28   in the *Extended Handoff Direction Message*.
  - 29   • If  $HARD\_INCLUDED$  is equal to '1', perform the following actions:
    - 30   - If  $FRAME\_OFFSET_r$  is not equal to  $FRAME\_OFFSET_s$ , change the frame offset  
31   on both the Forward Traffic Channel and the Reverse Traffic Channel.
    - 32   - If  $RESET\_L2_r$  is equal to '1', reset the acknowledgement procedures as  
33   specified in 6.6.4.1.3.3. The acknowledgement procedures shall be reset  
34   immediately after the action time of the *Extended Handoff Direction Message*.
    - 35   - If  $RESET\_FPC_r$  is equal to '1', initialize the Forward Traffic Channel power  
36   control counters as specified in 6.6.4.1.1.1.
    - 37   - Use the long code mask specified by the  $PRIVATE\_LCM_r$  (see 6.3.12.3) and  
38   indicate to the user the voice privacy mode status.
    - 39   - Process the  $ENCRYPT\_MODE$  field as specified in 6.3.12.2.

- 1       - If  $CDMA\_FREQ_r \neq CDMACH_s$ ,  $FRAME\_OFFSET_r \neq FRAME\_OFFSET_s$ , or the
- 2       set of pilots specified by the message is disjoint from the Active Set prior to
- 3       the action time of the message, the mobile station shall perform actions as
- 4       indicated in 6.6.6.2.8. If the message specifies more than one pilot, the
- 5       mobile station shall perform actions as specified in 6.6.6.2.7.
- 6       • If  $HARD\_INCLUDED$  is not equal to '1', set  $NUM\_PREAMBLE_s = '000'$ .
- 7       • Store the following parameters from the *Extended Handoff Direction Message*:
- 8       - *Extended Handoff Direction Message* sequence number ( $HDM\_SEQ_s =$
- 9        $HDM\_SEQ_r$ )
- 10      - If  $SEARCH\_INCLUDED$  is equal to '1', then store the following:
- 11       + Search window size for the Active Set and Candidate Set
- 12       ( $SRCH\_WIN\_A_s = SRCH\_WIN\_A_r$ )
- 13       + Pilot detection threshold ( $T\_ADD_s = T\_ADD_r$ )
- 14       + Pilot drop threshold ( $T\_DROP_s = T\_DROP_r$ )
- 15       + Active Set versus Candidate Set comparison threshold ( $T\_COMP_s =$
- 16        $T\_COMP_r$ )
- 17       + Drop timer value ( $T\_TDROP_s = T\_TDROP_r$ )
- 18      - If  $HARD\_INCLUDED$  is equal to '1', then store the following:
- 19       + Frame offset ( $FRAME\_OFFSET_s = FRAME\_OFFSET_r$ )
- 20       + Nominal power setting of the target cell ( $NOM\_PWR_s = NOM\_PWR_r$ )
- 21       + Hard handoff traffic channel preamble count required before transmitting
- 22       Handoff Completion Message ( $NUM\_PREAMBLE_s = NUM\_PREAMBLE_r$ )
- 23       + CDMA band class ( $BAND\_CLASS_s = BAND\_CLASS_r$ )
- 24       + Frequency assignment ( $CDMACH_s = CDMA\_FREQ_r$ )
- 25      - One or more occurrences of  $PILOT\_PN$ ,  $PWR\_COMB\_IND$ , and  $CODE\_CHAN$
- 26      for each included member of the active set.

#### 27 6.6.6.2.5.2 Processing of Reverse Traffic Channel Handoff Messages

28 The mobile station sends the following messages on the Reverse Traffic Channel in support  
 29 of handoff when its transmitter is enabled and following the receipt of the first Base Station  
 30 *Acknowledgement Order* on the Forward Traffic Channel:

- 31 1. Pilot Strength Measurement Message: The mobile station shall send an autonomous
- 32 Pilot Strength Measurement Message as a message requiring an acknowledgement
- 33 and containing measurements consistent with the event whenever any of the
- 34 following events occur:
- 35       • The strength of a Neighbor Set or Remaining Set pilot is found to be above
- 36        $T\_ADD_s$ .

- 1       • The strength of a Candidate Set pilot exceeds the strength of an Active Set pilot
- 2       by  $T\_COMP_s \times 0.5$  dB and a *Pilot Strength Measurement Message* carrying this
- 3       information has not been sent since the last *Extended Handoff Direction Message*
- 4       or *Handoff Direction Message* was received.
- 5       • The handoff drop timer of an Active Set pilot has expired and a *Pilot Strength*
- 6       *Measurement Message* carrying this information has not been sent since the last
- 7       *Extended Handoff Direction Message* or *Handoff Direction Message* was received.
- 8       2. *Handoff Completion Message*: The mobile station shall send the *Handoff*
- 9       *Completion Message* as a message requiring acknowledgement within  $T_{56m}$  seconds
- 10      after the action time of a received *Extended Handoff Direction Message* or *Handoff*
- 11      *Direction Message*.

#### 12      6.6.6.2.6 Set Maintenance

##### 13      6.6.6.2.6.1 Maintenance of the Active Set

14      The mobile station shall support a maximum Active Set size of  $N_{6m}$  pilots. The mobile

15      station shall track the pilot strengths of all pilots in the Active Set.

16      When the mobile station is first assigned a Forward Traffic Channel, the mobile station

17      shall initialize the Active Set to contain only the pilot associated with the assigned Forward

18      Traffic Channel. When the mobile station processes an *Extended Handoff Direction*

19      *Message* or *Handoff Direction Message* it shall replace the Active Set with the pilots listed in

20      the message.

##### 21      6.6.6.2.6.2 Maintenance of the Candidate Set

22      The mobile station shall support a maximum Candidate Set size of  $N_{7m}$  pilots.

23      When the mobile station is first assigned a Forward Traffic Channel, the mobile station

24      shall initialize the Candidate Set to contain no pilots. The mobile station shall adjust the

25      Candidate Set whenever any of the following events occur:

- 26      • If the mobile station detects that the strength of a Neighbor Set pilot or a Remaining
- 27      Set pilot exceeds  $T\_ADD_s$ , the mobile station shall add the pilot to the Candidate Set.
- 28      • If the mobile station processes an *Extended Handoff Direction Message* or *Handoff*
- 29      *Direction Message* which does not list a pilot in the current Active Set, and the
- 30      handoff drop timer corresponding to that pilot has not expired, the mobile station
- 31      shall add the pilot to the Candidate Set.
- 32      • If the mobile station processes an *Extended Handoff Direction Message* or *Handoff*
- 33      *Direction Message* which lists a pilot in the current Candidate Set, the mobile station
- 34      shall delete the pilot from the Candidate Set.
- 35      • If the handoff drop timer corresponding to a Candidate Set pilot expires, the mobile
- 36      station shall delete the pilot from the Candidate Set.
- 37      • If the mobile station adds a pilot to the Candidate Set and the resulting Candidate
- 38      Set size exceeds  $N_{7m}$ , the mobile station shall delete from the Candidate Set the pilot
- 39      whose handoff drop timer is closest to expiration. If more than one such pilot exists,

1 the mobile station shall delete one such pilot that has the lowest strength. If no pilot  
2 in the Candidate Set has an enabled handoff drop timer, the mobile station shall  
3 delete from the Candidate Set the pilot that has the lowest strength.

#### 4 6.6.6.2.6.3 Maintenance of the Neighbor Set

5 The mobile station shall support a Neighbor Set size of at least  $N_{gm}$  pilots.

6 When the mobile station is first assigned a Forward Traffic Channel, the mobile station  
7 shall initialize the Neighbor Set to contain all the pilots specified in the most recently  
8 received *Neighbor List Message*.

9 The mobile station shall maintain a counter,  $AGE_s$ , for each pilot in the Neighbor Set. The  
10 mobile station shall initialize this counter to zero when it moves the pilot from the Active  
11 Set or the Candidate Set to the Neighbor Set. The mobile station shall initialize this  
12 counter to  $NGHBR\_MAX\_AGE_s$  when it moves the pilot from the Remaining Set to the  
13 Neighbor Set. The mobile station shall increment  $AGE_s$  for each pilot in the Neighbor Set  
14 upon receipt of a *Neighbor List Update Message*. When the mobile station is first assigned  
15 to a Forward Traffic Channel, the mobile station shall set  $AGE_s$  for each pilot in the  
16 Neighbor Set to  $NGHBR\_MAX\_AGE_s$ .

17 The mobile station shall adjust the Neighbor Set whenever any of the following events  
18 occur:

- 19 • If the mobile station receives a *Neighbor List Update Message*, it shall perform the  
20 following:
  - 21 - Increment  $AGE_s$  for each pilot in the Neighbor Set.
  - 22 - Delete from the Neighbor Set all pilots whose  $AGE_s$  exceeds  $NGHBR\_MAX\_AGE_s$ .
  - 23 - Add to the Neighbor Set each pilot named in the message, if it is not already a  
24 pilot of the Candidate Set or Neighbor Set. If the mobile station can store in the  
25 Neighbor Set only  $k$  additional pilots and more than  $k$  new pilots were sent in the  
26 *Neighbor List Update Message*, the mobile station shall store the first  $k$  new pilots  
27 listed in the message.
- 28 • If the handoff drop timer of a pilot in the Candidate Set expires, the mobile station  
29 shall add the pilot to the Neighbor Set.
- 30 • If the mobile station processes an *Extended Handoff Direction Message* or *Handoff*  
31 *Direction Message* in which a pilot in the Active Set is not listed and the handoff drop  
32 timer corresponding to the pilot has expired, the mobile station shall add the pilot to  
33 the Neighbor Set.
- 34 • If the mobile station adds a pilot to the Candidate Set and the resulting Candidate  
35 Set size exceeds the size supported by the mobile station, the mobile station shall  
36 add the deleted Candidate Set pilot to the Neighbor Set (see 6.6.6.2.6.2).
- 37 • If the mobile station detects that the strength of a Neighbor Set pilot exceeds  
38  $T\_ADD_s$ , the mobile station shall delete the pilot from the Neighbor Set.



- 1       • If the mobile station processes an *Extended Handoff Direction Message* or *Handoff*  
2       *Direction Message* which lists a pilot in the current Neighbor Set, the mobile station  
3       shall delete the pilot from the Neighbor Set.
- 4       • If the mobile station adds a pilot to the Neighbor Set and the resulting Neighbor Set  
5       size exceeds the size supported by the mobile station, the mobile station shall delete  
6       from the Neighbor Set the pilot whose AGE<sub>s</sub> is the largest. If more than one such  
7       pilot exists, the mobile station shall delete one such pilot that has the lowest  
8       strength.

#### 9       6.6.6.2.7 Soft Handoff

##### 10      6.6.6.2.7.1 Forward Traffic Channel Processing

11      All Forward Traffic Channels associated with pilots in the Active Set of the mobile station  
12      carry identical modulation symbols with the exception of the power control subchannel (see  
13      7.1.3.1.7 and 7.6.6.2.4.2).

14      When the Active Set contains more than one pilot, the mobile station should provide  
15      diversity combining of the associated Forward Traffic Channels. The mobile station shall  
16      provide for differential propagation delays from zero to at least 150  $\mu$ s.

##### 17      6.6.6.2.7.2 Reverse Traffic Channel Power Control During Soft Handoff

18      The *Extended Handoff Direction Message* or *Handoff Direction Message* identifies sets of  
19      Forward Traffic Channels that carry identical closed loop power control subchannels. A set  
20      consists of one or more Forward Traffic Channels with identical power control information.

21      In each power control group containing valid power control bits (see 6.1.2.3.2), the mobile  
22      station should provide diversity combining of the identical closed loop power control  
23      subchannels and shall obtain at most one power control bit from each set of identical  
24      closed loop power control subchannels. If the power control bits obtained from all sets are  
25      equal to '0', the mobile station shall increase its power as specified in 6.1.2.3.2. If the  
26      power control bit obtained from any set is equal to '1', the mobile station shall decrease its  
27      power as specified in 6.1.2.3.2.

##### 28      6.6.6.2.8 CDMA to CDMA Hard Handoff

29      The base station directs the mobile station to perform a CDMA to CDMA hard handoff by  
30      sending an *Extended Handoff Direction Message* or *Handoff Direction Message* in which the  
31      mobile station is transitioned between disjoint sets of base stations, different frequency  
32      assignments, or different frame offsets.

33      At the action time specified in the *Extended Handoff Direction Message* or *Handoff Direction*  
34      *Message*, the mobile station shall disable its transmitter, reset the fade timer specified in  
35      6.4.4, suspend incrementing TOT\_FRAMES<sub>s</sub> and BAD\_FRAMES<sub>s</sub> as specified in 6.6.4.1.1,  
36      and tune to the assigned Forward Traffic Channel. The mobile station shall perform  
37      acquisition of the pilots in the new Active Set. Upon receiving N<sub>11m</sub> consecutive good  
38      frames on the assigned Forward Traffic Channel, the mobile station shall re-enable its  
39      transmitter. Upon receiving N<sub>3m</sub> consecutive good frames on the assigned Forward Traffic

1 Channel, the mobile station shall resume incrementing TOT\_FRAMES<sub>s</sub> and BAD\_FRAMES<sub>s</sub>  
 2 as specified in 6.6.4.1.1.

3 If NUM\_PREAMBLE<sub>s</sub> is not equal to '000', then upon receiving N<sub>11m</sub> good frames, the  
 4 mobile station shall transmit NUM\_PREAMBLE<sub>s</sub> frames of the Traffic Channel preamble.

5 If the *Extended Handoff Direction Message* or *Handoff Direction Message* specifies a CDMA  
 6 frequency assignment different from the current CDMA frequency assignment and an Active  
 7 Set containing pilots with pilot PN sequence offsets identical to those of the pilots in the  
 8 current Active Set, the mobile station shall begin monitoring the assigned Forward Traffic  
 9 Channel within T<sub>60m</sub> seconds after the action time.

10 If the *Extended Handoff Direction Message* or *Handoff Direction Message* specifies a CDMA  
 11 frequency assignment different from the current CDMA frequency assignment and an Active  
 12 Set containing a pilot with pilot PN sequence offset not equal to that of any pilot in the  
 13 current Active Set, the mobile station shall begin monitoring the assigned Forward Traffic  
 14 Channel within T<sub>61m</sub> seconds after the action time.

15 If the *Extended Handoff Direction Message* or *Handoff Direction Message* specifies a CDMA  
 16 to CDMA hard handoff using the current CDMA frequency assignment, the mobile station  
 17 shall begin monitoring the assigned Forward Traffic Channel within T<sub>62m</sub> seconds after the  
 18 action time.

#### 19 6.6.6.2.9 CDMA to Analog Handoff

20 The base station directs the mobile station to perform a CDMA to Analog handoff by  
 21 sending an *Analog Handoff Direction Message*. If the mobile station has narrow analog  
 22 capability, the base station may direct the handoff to a narrow analog channel.

23 The mobile station shall store the following parameters from the *Analog Handoff Direction*  
 24 *Message*:

- 25 • System identification (SID<sub>s</sub> = SID<sub>r</sub>)
- 26 • Voice mobile station attenuation code (VMAC<sub>s</sub> = VMAC<sub>r</sub>)
- 27 • Analog voice channel number (ANALOG\_CHAN<sub>s</sub> = ANALOG\_CHAN<sub>r</sub>)
- 28 • SAT color code (SCC<sub>s</sub> = SCC<sub>r</sub>)
- 29 • Message encryption mode indicator (MEM<sub>s</sub> = MEM<sub>r</sub>)
- 30 • Analog voice channel type (AN\_CHAN\_TYPE<sub>s</sub> = AN\_CHAN\_TYPE<sub>r</sub>)
- 31 • Digital supervisory audio color code (DSCC<sub>s</sub> = DSCC\_MSB<sub>r</sub> × 4 + SCC<sub>r</sub>)

32 If the ACK\_REQ field of the *Analog Handoff Direction Message* is set to '1', the mobile station  
 33 shall acknowledge the message before the message action time, unless there is insufficient  
 34 time to transmit a message containing the acknowledgement before the action time.  
 35 Insufficient time is defined as an explicit action time shorter than the maximum implicit  
 36 action time or too many outstanding messages remaining to be processed.

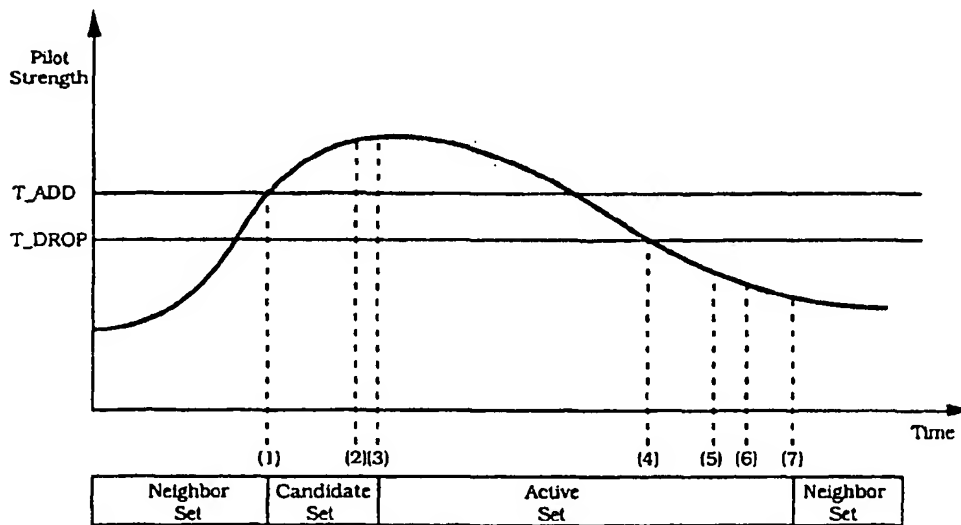
37 At the action time specified by the *Analog Handoff Direction Message* (see 6.6.4.1.5), the  
 38 mobile station shall disable its transmitter. The mobile station shall enable its transmitter  
 39 on the wide analog voice channel or optional narrow analog voice channel within T<sub>63m</sub>  
 40 seconds after the action time.

### 6.6.6.3 Examples

The following examples illustrate typical message exchanges between the mobile station and the base station during handoff. Refer to Appendix B for examples of call processing during handoff.

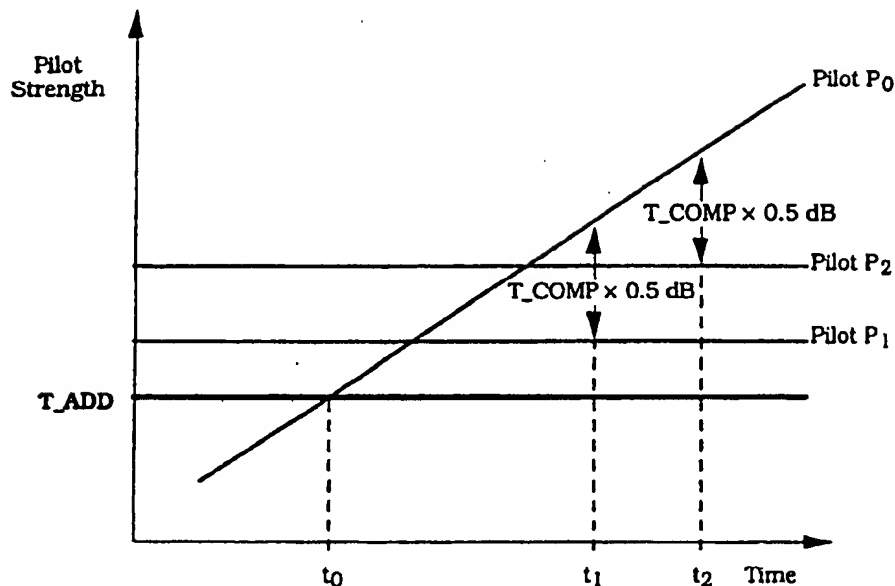
Figure 6.6.6.3-1 shows an example of the messages exchanged between the mobile station and the base station during a typical handoff process.

Figure 6.6.6.3-2 illustrates the messaging triggered by a pilot of the Candidate Set as its strength gradually rises above the strength of each pilot of the Active Set. Note that the mobile station reports that a Candidate Set pilot is stronger than an Active Set pilot only if the difference between their respective strengths is at least  $T\_COMP \times 0.5$  dB.



- (1) Pilot strength exceeds  $T\_ADD$ . Mobile station sends a *Pilot Strength Measurement Message* and transfers pilot to the Candidate Set.
- (2) Base station sends a *Handoff Direction Message*.
- (3) Mobile station transfers pilot to the Active Set and sends a *Handoff Completion Message*.
- (4) Pilot strength drops below  $T\_DROP$ . Mobile station starts the handoff drop timer.
- (5) Handoff drop timer expires. Mobile station sends a *Pilot Strength Measurement Message*.
- (6) Base station sends a *Handoff Direction Message*.
- (7) Mobile station moves pilot from the Active Set to the Neighbor Set and sends a *Handoff Completion Message*.

**Figure 6.6.6.3-1. Handoff Threshold Example**



Candidate Set: Pilot  $P_0$

Active Set: Pilots  $P_1, P_2$

$t_0$  — Pilot Strength Measurement Message sent,  $P_0 > T\_ADD$

$t_1$  — Pilot Strength Measurement Message sent,  $P_0 > P_1 + T\_COMP \times 0.5 \text{ dB}$

$t_2$  — Pilot Strength Measurement Message sent,  $P_0 > P_2 + T\_COMP \times 0.5 \text{ dB}$

Figure 6.6.6.3-2. Pilot Strength Measurements Triggered by a Candidate Pilot

## 6.6.7 Hash Functions and Randomization

### 6.6.7.1 Hash Function

Certain procedures require a uniform distribution of mobile stations among  $N$  resources. The following function returns an integer, using as arguments the mobile station's IMSI or ESN, the number of resources  $N$ , and a modifier DECORR. The modifier serves to decorrelate the values obtained for the various applications from the same mobile station.

If the hashing function is to be used for determining the Access Channel PN Randomization, HASH\_KEY shall be equal to the mobile station ESN. Otherwise, HASH\_KEY shall be equal to the 32 least significant bits of  $\text{IMSI\_S1} + 2^{24} \times \text{IMSI\_S2}$ .

1 Define:

- 2 • Word L to be bits 0-15 of HASH\_KEY
- 3 • Word H to be bits 16-31 of HASH\_KEY

4 where bit 0 is the least significant bit of HASH\_KEY. The hash value is computed as  
5 follows:<sup>23</sup>

$$6 \quad R = \lfloor N \times ((40503 \times (L \oplus H \oplus \text{DECORR})) \bmod 2^{16}) / 2^{16} \rfloor$$

7 Define:

- 8 • Word L to be bits 0-15 of HASH\_KEY
- 9 • Word H to be bits 16-31 of HASH\_KEY

10 where bit 0 is the least significant bit of HASH\_KEY. The hash value is computed as  
11 follows:<sup>24</sup>

$$12 \quad R = \lfloor N \times ((40503 \times (L \oplus H \oplus \text{DECORR})) \bmod 2^{16}) / 2^{16} \rfloor$$

13 The mobile station shall choose the range N and the 16-bit modifier DECORR according to  
14 the application as shown in Table 6.6.7.1-1. In the table, HASH\_KEY [0...11] denotes the  
15 12 least significant bits of HASH\_KEY.

17 Table 6.6.7.1-1. Hash Function Modifier

Application	N	DECORR	Return Value
CDMA Channel Number	Number of channels in last <i>CDMA Channel List Message</i> (up to 10)	0	R + 1
Paging Channel Number	PAGE_CHAN <sub>s</sub> from <i>System Parameters Message</i> (up to 7)	2 × HASH_KEY [0...11]	R + 1
Paging Slot Number	2048	6 × HASH_KEY[0...11]	R
Access Channel PN Randomization	2 <sup>PROBE_PN_RAN<sub>s</sub></sup> where PROBE_PN_RAN <sub>s</sub> is from <i>Access Parameters Message</i> (up to 512)	14 × HASH_KEY[0...11]	R

<sup>23</sup>This formula is adapted from Knuth, D. N., *Sorting and Searching*, vol. 3 of *The Art of Computer Programming*, 3 vols., (Reading, MA: Addison-Wesley, 1973), pp. 508-513.

<sup>24</sup>This formula is adapted from Knuth, D. N., *Sorting and Searching*, vol. 3 of *The Art of Computer Programming*, 3 vols., (Reading, MA: Addison-Wesley, 1973), pp. 508-513.

### 6.6.7.2 Pseudorandom Number Generator

Where pseudorandom numbers are needed in the CDMA cellular protocols, a linear congruential generator shall be used. The mobile station shall implement the linear congruential generator defined by:

$$z_n = a \times z_{n-1} \bmod m$$

where  $a = 7^5 = 16807$  and  $m = 2^{31} - 1 = 2147483647$ .  $z_n$  is the output of the generator.<sup>25</sup>

During the *Mobile Station Initialization State*, the mobile station shall seed its generator with

$$z_0 = (\text{ESN} \oplus \text{RANDOM\_TIME}) \bmod m$$

where *RANDOM\_TIME* shall be the least-significant 32-bits of *SYS\_TIME<sub>s</sub>* stored from the *Sync Channel Message*. If the initial value so produced is found to be zero, it shall be replaced with one. The mobile station shall compute a new  $z_n$  for each subsequent use.

The mobile station shall use the value  $u_n = z_n / m$  for those applications that require a binary fraction  $u_n$ ,  $0 < u_n < 1$ .

The mobile station shall use the value  $k_n = \lfloor N \times z_n / m \rfloor$  for those applications that require a small integer  $k_n$ ,  $0 \leq k_n \leq N-1$ .

### 6.7 Signaling Formats

This section describes the messages sent by the mobile station.

Some bits in the following message formats are marked as *RESERVED*. These bits allow for extensions to the basic message for future features and capabilities. The mobile station sets all reserved bits to '0'.

All messages have a set of acknowledgement fields. These fields are *ACK\_SEQ*, *MSG\_SEQ*, *ACK\_REQ*, and *VALID\_ACK* for Access Channel messages and *ACK\_SEQ*, *MSG\_SEQ*, and *ACK\_REQ* for Reverse Traffic Channel messages.

In any multi-bit field of a signaling message, the most significant bit shall be transmitted first.

#### 6.7.1 Access Channel

This section describes the messages sent by the mobile station on the Access Channel (see 6.1.3.2).

##### 6.7.1.1 Access Channel Structure

An Access Channel slot is  $(3 + \text{MAX\_CAP\_SZ}) + (1 + \text{PAM\_SZ})$  Access Channel frames in length. An Access Channel slot begins and ends on an Access Channel frame boundary. Access Channel slots begin at Access Channel frames in which

<sup>25</sup>This generator has full period, ranging over all integers from 1 to  $m-1$ ; the values 0 and  $m$  are never produced. Several suitable implementations can be found in Park, Stephen K. and Miller, Keith W., "Random Number Generators: Good Ones are Hard to Find," *Communications of the ACM*, vol. 31, no. 10, October 1988, pp. 1192-1201.

$$t \bmod (4 + \text{MAX\_CAP\_SZ} + \text{PAM\_SZ}) = 0,$$

where  $t$  is the System Time in frames. Note that all Access Channels associated with a particular Paging Channel have the same slot size and that all of the slots begin at the same time. Figure 6.7.1.1-1 shows an example of Access Channel slots. Figure 6.7.1.1-2 shows the Access Channel structure.

The Access Channel slot length may differ from base station to base station. A mobile station shall determine the beginning and length of the Access Channel slot prior to transmission.

An Access Channel transmission consists of the Access Channel preamble and the Access Channel message capsule. An Access Channel transmission shall be an integer number of Access Channel frames in length and shall not exceed  $4 + \text{MAX\_CAP\_SZ} + \text{PAM\_SZ}$  Access Channel frames in length.

On each Access Channel transmission, the mobile station shall transmit a preamble consisting of 96 zeros (see 6.1.3.2.2.1) starting at the beginning of the slot (plus PN randomization as specified in 6.6.3.1.1.2) and  $1 + \text{PAM\_SZ}$  Access Channel frames in length. The mobile station shall transmit an Access Channel message capsule immediately following the preamble.

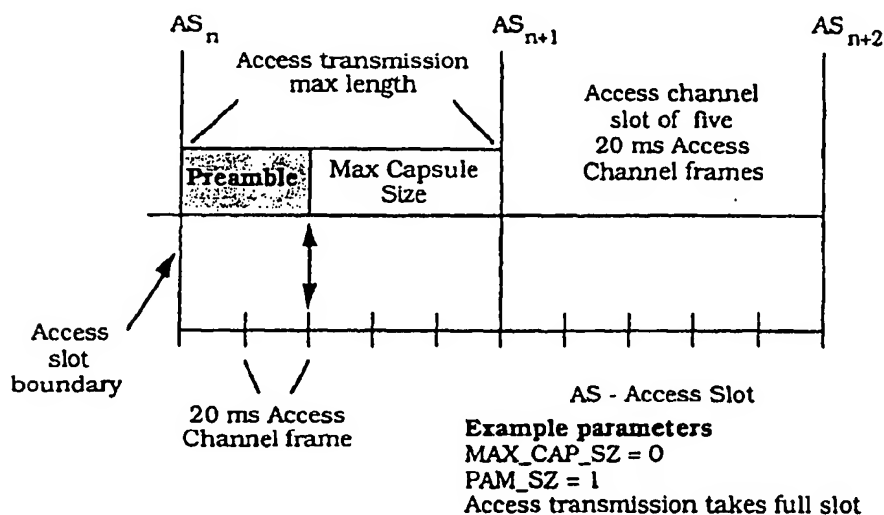


Figure 6.7.1.1-1. Example of Access Channel Slot Structure

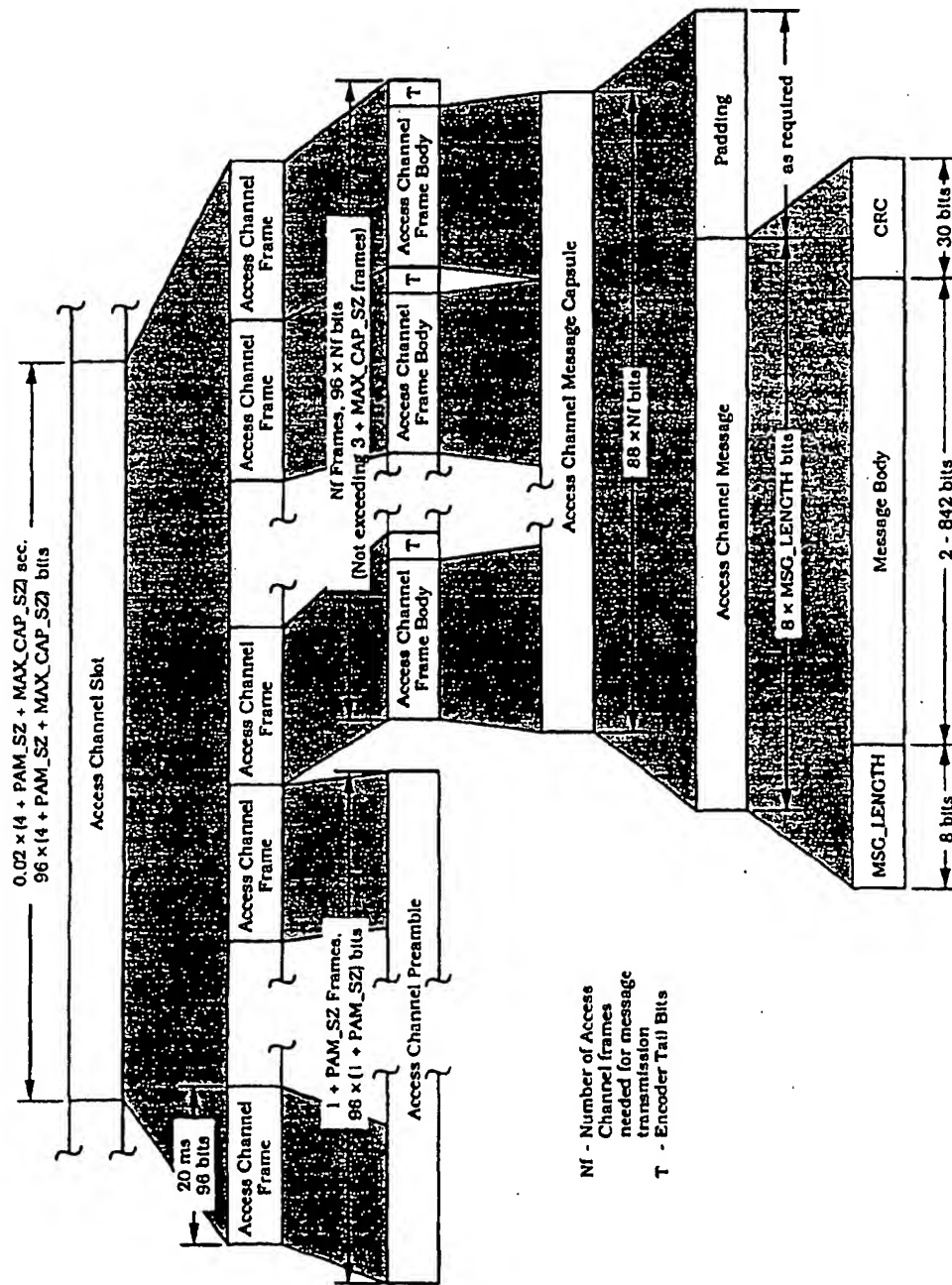


Figure 6.7.1.1-2. Access Channel Structure



### 6.7.1.2 Access Channel Message Structure

An Access Channel message capsule consists of an Access Channel message and padding, as shown in Figure 6.7.1.2-1. The length of the Access Channel message capsule shall be an integer number of Access Channel frames given by

$$CAP\_SZ = \left\lceil \frac{8 + \text{Message Body Length} + 30}{88} \right\rceil$$

Each Access Channel message shall consist of a length field (MSG\_LENGTH), a message body, and a CRC, in that order. The message body size shall be selected so that CAP\_SZ does not exceed 3 + MAX\_CAP\_SZ. The mobile station shall transmit the Access Channel message immediately following the preamble.

The mobile station shall transmit padding consisting of zero or more '0' bits immediately following the Access Channel message. The length of the padding shall be such that

$$8 + \text{Message Body Length} + 30 + \text{Padding Length} = 88 \times CAP\_SZ$$

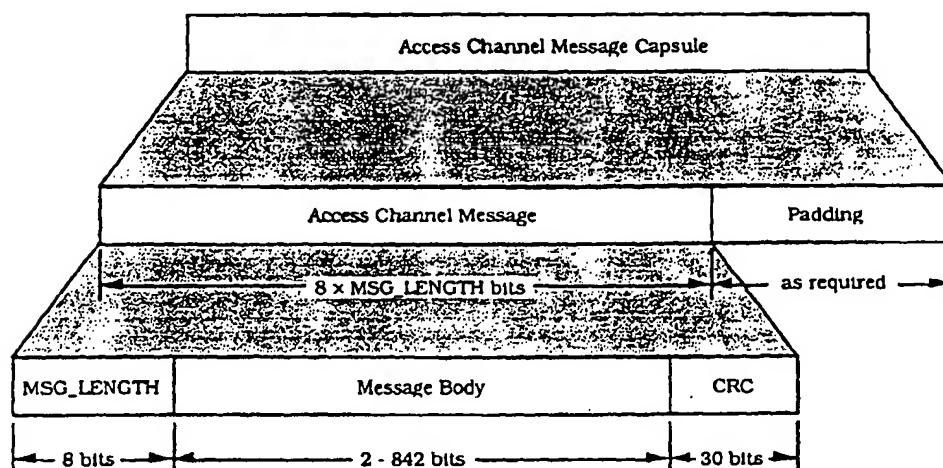


Figure 6.7.1.2-1. Access Channel Message Structure

#### 6.7.1.2.1 Access Channel MSG\_LENGTH Field

The mobile station shall set the MSG\_LENGTH field of each Access Channel signaling message to the length of the message in octets, including the MSG\_LENGTH field, the message body, and the CRC, but not including the preamble or the padding. The MSG\_LENGTH field shall be 8 bits in length. Consistent with a maximum MAX\_CAP\_SZ value of 7, the mobile station shall limit the maximum Access Channel message length to 110 octets, or 880 bits. That is, the value of the MSG\_LENGTH field shall not exceed 110.

### 6.7.1.2.2 Access Channel Message CRC

A 30-bit CRC shall be computed for each Access Channel signaling message. The CRC shall include the MSG\_LENGTH field and the message body. The generator polynomial for the CRC shall be as follows:

$$g(x) = x^{30} + x^{29} + x^{21} + x^{20} + x^{15} + x^{13} + x^{12} + x^{11} + x^8 + x^7 + x^6 + x^2 + x + 1.$$

The CRC shall be the value computed by the following procedure and the logic shown in Figure 6.7.1.2.2-1:

- All shift register elements shall be initialized to logical one.<sup>26</sup>
- The switches shall be set in the up position.
- The information bit count  $k$  shall be defined as 8 + message body length in bits.
- The register shall be clocked  $k$  times, with the length and message body of the message as the  $k$  input bits.
- The switches shall be set in the down position.
- The register shall be clocked an additional 30 times.
- The 30 additional output bits shall be the CRC field.
- The bits shall be transmitted in the order in which they appear at the output of the CRC encoder.

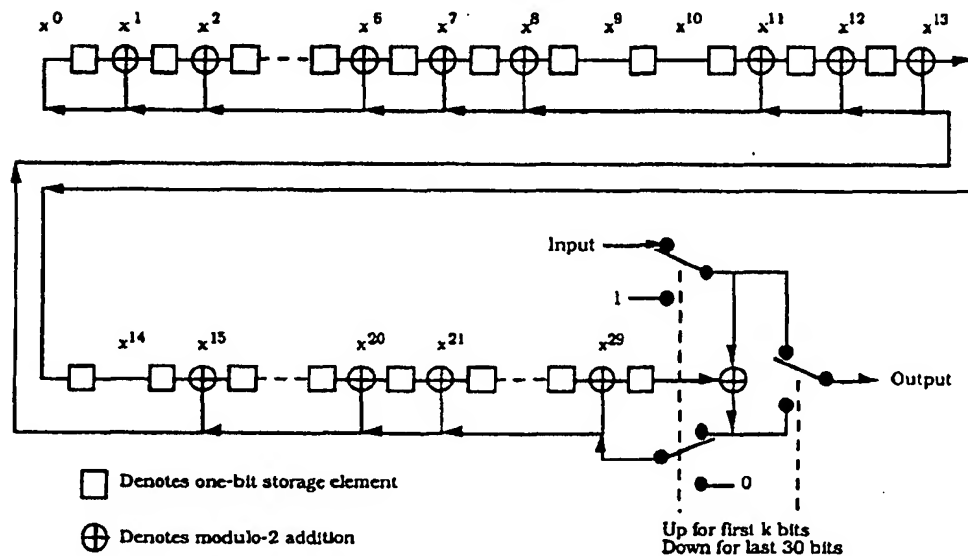


Figure 6.7.1.2.2-1. Access Channel CRC Calculation

<sup>26</sup>Initialization of the register to ones causes the CRC for all-zero data to be non-zero.

### 6.7.1.3 Access Channel Message Body Format

The messages sent on the Access Channel are summarized in Table 6.7.1.3-1.

**Table 6.7.1.3-1. Access Channel Messages**

Message Name	Message Type (binary)
Registration Message	00000001
Order Message	00000010
Data Burst Message	00000011
Origination Message	00000100
Page Response Message	00000101
Authentication Challenge Response Message	00000110

#### 6.7.1.3.1 Common Fields

##### 6.7.1.3.1.1 Common Layer 2 and Identification Fields

All Access Channel messages share the following eight fields:

**ACK\_SEQ** - Acknowledgement sequence number.

The mobile station shall set this field to the value of the MSG\_SEQ field from the most recently received Paging Channel message requiring acknowledgement. If no such message has been received, the mobile station shall set this field to '111'. See 6.6.2.1.2.

**MSG\_SEQ** - Message sequence number.

The mobile station shall set this field to the message sequence number for this message. See 6.6.3.1.2.

**ACK\_REQ** - Acknowledgement required indicator. This field indicates whether this message requires an acknowledgement. The mobile station shall set the ACK\_REQ field of all messages sent on the Access Channel to '1'.

**VALID\_ACK** - Valid acknowledgement indicator.

To acknowledge a Paging Channel message, the mobile station shall set this field to '1'. Otherwise, the mobile station shall set this field to '0'. See 6.6.2.1.2.

**ACK\_TYPE** - Acknowledgement address type.

The mobile station shall set this field to the value of the ADDR\_TYPE field, if present, from the most recently received Paging Channel message requiring acknowledgement. If the Paging Channel message contained no ADDR\_TYPE field, or if no such message has been received, the mobile station shall set this field to '000'.

1 **MSID\_TYPE** - Mobile station identifier field type.

2 The mobile station shall set this field to the value shown in  
3 Table 6.7.1.3.1.1-1 corresponding to the identifier type  
4 contained in the MSID field.

5  
6 **Table 6.7.1.3.1.1-1. Address Types**

Description	MSID_TYPE (binary)	MSID_LEN (octets)
IMSI_S and ESN	000	9
ESN	001	4
IMSI	010	5 to 7
IMSI and ESN	011	9 to 11
All other MSID_TYPE values are reserved		

7  
8 **MSID\_LEN** - Mobile station identifier field length.

9 The mobile station shall set this field to the number of octets  
10 included in the MSID field.

11 **MSID** - Mobile station identifier.

12 The mobile station shall set this field to the mobile station  
13 identifier, using the identifier type specified in the MSID\_TYPE  
14 field.

15  
16 If MSID\_TYPE is equal to '000', the MSID field shall consist of  
17 the following subfields:

Subfield	Length (bits)
MIN1	24
MIN2	10
ESN	32
RESERVED	6

If MSID\_TYPE is equal to '001', the MSID field shall consist of the following subfield:

Subfield	Length (bits)
ESN	$8 \times \text{MSID\_LEN}$

If MSID\_TYPE is equal to '010', the MSID field shall consist of the following subfields:

Subfield	Length (bits)
IMSI_CLASS	1
IMSI class specific subfields	$7 + 8 \times (\text{MSID\_LEN} - 1)$

If MSID\_TYPE is equal to '011', the MSID field shall consist of the following subfields:

Subfield	Length (bits)
ESN	32
IMSI_CLASS	1
IMSI class specific subfields	$7 + 8 \times (\text{MSID\_LEN} - 5)$

If the MSID\_TYPE is equal to '000', the mobile station shall include the following four fields in the MSID field:

- MIN1 - First part of the mobile identification number (MIN).  
The mobile station shall set this field to IMSI\_S1 (see 6.3.1).
- MIN2 - Second part of the mobile identification number (MIN).  
The mobile station shall set this field to IMSI\_S2 (see 6.3.1).
- ESN - Mobile station's electronic serial number.  
The mobile station shall set this field to its electronic serial number. See 2.3.2.
- RESERVED - Reserved bits.  
The mobile station shall set this field to '000000'.

If the MSID\_TYPE is equal to '001', the mobile station shall include the following field in the MSID field:

- ESN - Mobile station's electronic serial number.  
The mobile station shall set this field to its electronic serial number. See 2.3.2.

If the MSID\_TYPE is equal to '010', the mobile station shall include the following fields in the MSID field:

6	<b>IMSI class specific</b>	-	<b>IMSI class specific subfields.</b>
6	subfields		The mobile station shall set this field to the appropriate class specific subfields as described below.
7			

ESN - Mobile station's electronic serial number.

The mobile station shall set this field to its electronic serial number. See 2.3.2.

16	IMSI class specific	- IMSI class specific subfields.
17	subfields	The mobile station shall set this field to the appropriate class
18	.	specific subfields as described below.

IMSI Class Specific Subfield	Length (bits)
IMSI_CLASS_0_TYPE	2
IMSI class 0 type specific subfields	see Table 6.7.1.3.1.1-2

IMSI Class Specific Subfield	Length (bits)
IMSI_CLASS_1_TYPE	1
IMSI class 1 type specific subfields	see Table 6.7.1.3.1.1-3

IMSI\_CLASS\_0\_TYPE - The mobile station shall set this field as described in 6.6.2.1.5 (see Table 6.7.1.3.1.1-2).

Table 6.7.1.3.1.1-2. IMSI Class 0 Types

Description	IMSI_CLASS_0_TYPE (binary)	Length of IMSI Class 0 Type Specific Subfields (bits)
IMSI_S included	00	37
IMSI_S and IMSI_11_12 included	01	45
IMSI_S and MCC included	10	45
IMSI_S, IMSI_11_12, and MCC included	11	53

IMSI class 0 type - IMSI class 0 type specific subfields.

specific subfields The mobile station shall set this field to the IMSI class 0 type specific subfields as described below.

If the IMSI\_CLASS is equal to '1', the mobile station shall include the following fields in the IMSI class specific subfields:

IMSI\_CLASS\_1\_TYPE - The mobile station shall set this field as described in 6.6.2.1.5 (see Table 6.7.1.3.1.1-3).

Table 6.7.1.3.1.1-3. IMSI Class 1 Types

Description	IMSI_CLASS_1_TYPE (binary)	Length of IMSI Class 1 Type Specific Subfields (bits)
IMSI_S and IMSI_11_12 included	0	46
IMSI_S, IMSI_11_12, and MCC included	1	54

1 IMSI class 1 type  
2 specific subfields

IMSI class 1 type specific subfields.

The mobile station shall set this field to the IMSI class 1 type specific subfields as described below.

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '00', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	3
IMSI_S	34

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '01', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	4
IMSI_11_12	7
IMSI_S	34

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '10', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	1
MCC	10
IMSI_S	34

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '11', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	2
MCC	10
IMSI_11_12	7
IMSI_S	34



If IMSI\_CLASS is equal to '1' and IMSI\_CLASS\_1\_TYPE is equal to '0', then the IMSI class 1 type specific subfields shall consist of:

IMSI Class 1 Type Specific Subfield	Length (bits)
RESERVED	2
IMSI_ADDR_NUM	3
IMSI_11_12	7
IMSI_S	34

If IMSI\_CLASS is equal to '1' and IMSI\_CLASS\_1\_TYPE is equal to '1', then the IMSI class 1 type specific subfields shall consist of:

IMSI Class 1 Type Specific Subfield	Length (bits)
IMSI_ADDR_NUM	3
MCC	10
IMSI_11_12	7
IMSI_S	34

If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '00', the mobile station shall include the following fields in the IMSI class 0 type specific subfields:

- RESERVED - Reserved bits.  
The mobile station shall set these bits to '000'.
- IMSI\_S - Last ten digits of the IMSI.  
The mobile station shall set this field to IMSI\_S. See 6.3.1.

If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '01', the mobile station shall include the following fields in the IMSI class 0 type specific subfields:

- RESERVED - Reserved bits.  
The mobile station shall set these bits to '0000'.
- IMSI\_11\_12 - The 11th and 12th digits of IMSI.  
The mobile station shall set this field to IMSI\_11\_12. See 6.3.1.
- IMSI\_S - Last ten digits of the IMSI.  
The mobile station shall set this field to IMSI\_S. See 6.3.1.

If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '10', the mobile station shall include the following fields in the IMSI class 0 type specific subfields:

- RESERVED - Reserved bit.  
The mobile station shall set this bit to '0'.

- 1                   MCC   -   Mobile country code.  
2                               The mobile station shall set this field to the MCC. See 6.3.1.
- 3                   IMSI\_S   -   Last ten digits of the IMSI.  
4                               The mobile station shall set this field to IMSI\_S. See 6.3.1.
- 5   If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '11', the mobile  
6   station shall include the following fields in the IMSI class 0 type specific subfields:
- 7                   RESERVED   -   Reserved bits.  
8                               The mobile station shall set these bits to '00'.
- 9                   MCC   -   Mobile country code.  
10                               The mobile station shall set this field to the MCC. See 6.3.1.
- 11                  IMSI\_11\_12   -   The 11th and 12th digits of IMSI.  
12                               The mobile station shall set this field to IMSI\_11\_12.  
13                               See 6.3.1.
- 14                  IMSI\_S   -   Last ten digits of the IMSI.  
15                               The mobile station shall set this field to IMSI\_S. See 6.3.1.
- 16   If the IMSI\_CLASS is equal to '1' and the IMSI\_CLASS\_1\_TYPE is equal to '0', the mobile  
17   station shall include the following fields in the IMSI class 1 type specific subfields:
- 18                  RESERVED   -   Reserved bits.  
19                               The mobile station shall set these bits to '00'.
- 20                  IMSI\_ADDR\_NUM   -   Number of IMSI address digits.  
21                               The mobile station shall set this field to four less than the  
22                               number of digits in the NMSI.
- 23                  IMSI\_11\_12   -   The 11th and 12th digits of IMSI.  
24                               The mobile station shall set this field to IMSI\_11\_12.  
25                               See 6.3.1.
- 26                  IMSI\_S   -   Last ten digits of the IMSI.  
27                               The mobile station shall set this field to IMSI\_S. See 6.3.1.
- 28   If the IMSI\_CLASS is equal to '1' and the IMSI\_CLASS\_1\_TYPE is equal to '1', the mobile  
29   station shall include the following fields in the IMSI class 1 type specific subfields:
- 30                  IMSI\_ADDR\_NUM   -   Number of IMSI address digits.  
31                               The mobile station shall set this field to four less than the  
32                               number of digits in the NMSI.
- 33                  MCC   -   Mobile country code.  
34                               The mobile station shall set this field to the MCC. See 6.3.1.
- 35                  IMSI\_11\_12   -   The 11th and 12th digits of IMSI.  
36                               The mobile station shall set this field to IMSI\_11\_12.  
37                               See 6.3.1.
- 38                  IMSI\_S   -   Last ten digits of the IMSI.  
39                               The mobile station shall set this field to IMSI\_S. See 6.3.1.

#### 1 6.7.1.3.1.2 Common Authentication Fields

2 Most Access Channel messages share the same four fields related to authentication:

- |    |                  |   |  |
|----|------------------|---|--|
| 3  | <b>AUTH_MODE</b> | - | Authentication mode.   |
| 4  |                  |   | If authentication information is not available, or if the base                 |
| 5  |                  |   | station has indicated that authentication is not required                      |
| 6  |                  |   | (AUTH <sub>s</sub> is set to '00'), the mobile station shall set this field to |
| 7  |                  |   | '00'. If authentication is required by the base station and                    |
| 8  |                  |   | authentication information is available, the mobile station                    |
| 9  |                  |   | shall set this field to '01'. All other values are reserved.                   |
| 10 | <b>AUTHR</b>     | - | Authentication data.   |
| 11 |                  |   | If the AUTH_MODE field is set to '01', the mobile station shall                |
| 12 |                  |   | set this field as specified in 6.3.12.1. If the AUTH_MODE field                |
| 13 |                  |   | is set to any other value, the mobile station shall omit this                  |
| 14 |                  |   | field.   |
| 15 | <b>RANDC</b>     | - | Random challenge value.  |
| 16 |                  |   | If the AUTH_MODE field is set to '01', the mobile station shall                |
| 17 |                  |   | set this field as specified in 6.3.12.1. If the AUTH_MODE field                |
| 18 |                  |   | is set to any other value, the mobile station shall omit this                  |
| 19 |                  |   | field.   |
| 20 | <b>COUNT</b>     | - | Call history parameter.  |
| 21 |                  |   | If the AUTH_MODE field is set to '01', the mobile station shall                |
| 22 |                  |   | set this field to the current value of the COUNT <sub>s-p</sub> parameter.     |
| 23 |                  |   | If the AUTH_MODE field is set to any other value, the mobile                   |
| 24 |                  |   | station shall omit this field.   |

#### 25 6.7.1.3.2 Message Body Contents

26 The following sections specify the contents of the message body for each message that may  
27 be sent on the Access Channel.

1 6.7.1.3.2.1 Registration Message

2 When the mobile station sends a *Registration Message*, it shall use the following variable-  
 3 length message format:

Field	Length (bits)
MSG_TYPE ('00000001')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ACK_TYPE	3
MSID_TYPE	3
MSID_LEN	4
MSID	8 × MSID_LEN
AUTH_MODE	2
AUTHR	0 or 18
RANDC	0 or 8
COUNT	0 or 6
REG_TYPE	4
SLOT_CYCLE_INDEX	3
MOB_P_REV	8
SCM	8
MOB_TERM	1
RESERVED	6

- 5
- 6 MSG\_TYPE - Message type.
- 7 The mobile station shall set this field to '00000001'.
- 8 ACK\_SEQ - Acknowledgement sequence number.
- 9 See 6.7.1.3.1.1.
- 10 MSG\_SEQ - Message sequence number.
- 11 See 6.7.1.3.1.1.
- 12 ACK\_REQ - Acknowledgement required indicator.
- 13 See 6.7.1.3.1.1.

1	VALID_ACK	- Valid acknowledgement indicator.
2		See 6.7.1.3.1.1.
3	ACK_TYPE	- Acknowledgement address type.
4		See 6.7.1.3.1.1.
5	MSID_TYPE	- Mobile station identifier field type.
6		See 6.7.1.3.1.1.
7	MSID_LEN	- Mobile station identifier field length.
8		See 6.7.1.3.1.1.
9	MSID	- Mobile station identifier.
10		See 6.7.1.3.1.1.
11	AUTH_MODE	- Authentication mode.
12		See 6.7.1.3.1.2.
13	AUTHR	- Authentication data.
14		See 6.7.1.3.1.2.
15	RANDC	- Random challenge value.
16		See 6.7.1.3.1.2.
17	COUNT	- Call history parameter.
18		See 6.7.1.3.1.2.
19	REG_TYPE	- Registration type.
20		This field indicates which type of event generated the
21		registration attempt.
22		The mobile station shall set this field to the REG_TYPE value
23		shown in Table 6.7.1.3.2.1-1 corresponding to the event that
24		caused this registration to occur (see 6.6.5.1).
25		

Table 6.7.1.3.2.1-1. Registration Type (REG\_TYPE) Codes

REG_TYPE (binary)	Type of Registration
0000	Timer-based (see 6.6.5.1.3)
0001	Power-up (see 6.6.5.1.1)
0010	Zone-based (see 6.6.5.1.5)
0011	Power-down (see 6.6.5.1.2)
0100	Parameter-change (see 6.6.5.1.6)
0101	Ordered (see 6.6.5.1.7)
0110	Distance-based (see 6.6.5.1.4)
All other REG_TYPE values are reserved.	

- 2
- 3   SLOT\_CYCLE\_INDEX   -   Slot cycle index.
- 4                            If the mobile station is configured for slotted mode operation,
- 5                            the mobile station shall set this field to the preferred slot cycle
- 6                            index, SLOT\_CYCLE\_INDEX<sub>p</sub> (see 6.6.2.1.1). Otherwise, the
- 7                            mobile station shall set this field to '000'.
- 8            MOB\_P\_REV   -   Protocol revision of the mobile station.
- 9                            The mobile station shall set this field to "00000010".
- 10           SCM       -   Station class mark.
- 11                            The mobile station shall set this field to its station class mark.
- 12                            See 2.3.3.
- 13           MOB\_TERM   -   Mobile terminated calls accepted indicator.
- 14                            If the mobile station is configured to accept mobile terminated
- 15                            calls while operating with the current roaming status (see
- 16                            6.6.5.3), the mobile station shall set this bit to '1'. Otherwise,
- 17                            the mobile station shall set this bit to '0'.
- 18           RESERVED   -   Reserved bits
- 19                            The mobile station shall set this field to '000000'.

## 6.7.1.3.2.2 Order Message

When the mobile station sends an *Order Message* on the Access Channel, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000010')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ACK_TYPE	3
MSID_TYPE	3
MSID_LEN	4
MSID	8 × MSID_LEN
RESERVED	2
ORDER	6
ADD_RECORD_LEN	3
order-specific fields (if used)	8 × ADD_RECORD_LEN
RESERVED	5

MSG\_TYPE - Message type.

The mobile station shall set this field to '00000010'.

ACK\_SEQ - Acknowledgement sequence number.

See 6.7.1.3.1.1.

MSG\_SEQ - Message sequence number.

See 6.7.1.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 6.7.1.3.1.1.

VALID\_ACK - Valid acknowledgement indicator.

See 6.7.1.3.1.1.

ACK\_TYPE - Acknowledgement address type.

See 6.7.1.3.1.1.

MSID\_TYPE - Mobile station identifier field type.

See 6.7.1.3.1.1.

1	MSID_LEN	-	Mobile station identifier field length.
2			See 6.7.1.3.1.1.
3	MSID	-	Mobile station identifier.
4			See 6.7.1.3.1.1.
5	RESERVED	-	Reserved bits.
6			These bits take the place of the AUTH_MODE field.
7			The mobile station shall set this field to '00'.
8	ORDER	-	Order code.
9			The mobile station shall set this field to the ORDER code
10			(see 6.7.3) for this type of <i>Order Message</i> .
11	ADD_RECORD_LEN	-	Additional record length.
12			The mobile station shall set this field to the number of octets
13			in the order-specific fields included in this message.
14	order-specific fields	-	Order-specific fields.
15			The mobile station shall include order-specific fields as
16			specified in 6.7.3.
17	RESERVED	-	Reserved bits.
18			The mobile station shall set this field to '00000'.



### 6.7.1.3.2.3 Data Burst Message

When the mobile station sends a *Data Burst Message* on the Access Channel, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000011')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ACK_TYPE	3
MSID_TYPE	3
MSID_LEN	4
MSID	8 × MSID_LEN
AUTH_MODE	2
AUTHR	0 or 18
RANDC	0 or 8
COUNT	0 or 6
MSG_NUMBER	8
BURST_TYPE	6
NUM_MSGS	8
NUM_FIELDS	8

NUM\_FIELDS occurrences of the following field:

CHAR1	8
-------	---

MSG\_TYPE - Message type.

The mobile station shall set this field to '00000011'.

ACK\_SEQ - Acknowledgement sequence number.

See 6.7.1.3.1.1.

MSG\_SEQ - Message sequence number.

See 6.7.1.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 6.7.1.3.1.1.

1	VALID_ACK	- Valid acknowledgement indicator.
2		See 6.7.1.3.1.1.
3	ACK_TYPE	- Acknowledgement address type.
4		See 6.7.1.3.1.1.
5	MSID_TYPE	- Mobile station identifier field type.
6		See 6.7.1.3.1.1.
7	MSID_LEN	- Mobile station identifier field length.
8		See 6.7.1.3.1.1.
9	MSID	- Mobile station identifier.
10		See 6.7.1.3.1.1.
11	AUTH_MODE	- Authentication mode.
12		See 6.7.1.3.1.2.
13	AUTHR	- Authentication data.
14		See 6.7.1.3.1.2.
15	RANDC	- Random challenge value.
16		See 6.7.1.3.1.2.
17	COUNT	- Call history parameter.
18		See 6.7.1.3.1.2.
19	MSG_NUMBER	- Message number within the data burst stream.
20		The mobile station shall set this field to the number of this
21		message within the data burst stream.
22	BURST_TYPE	- Data burst type.
23		The mobile station shall set the value of this field for the type
24		of this data burst as defined in TSB58, <i>Administration of</i>
25		<i>Parameter Value Assignments for TIA/EIA Wideband Spread</i>
26		<i>Spectrum Standards</i> . If the mobile station sets this field equal
27		to '111111', it shall set the first two CHARi fields of this
28		message equal to the EXTENDED BURST TYPE as described
29		in the definition of CHARi below.
30	NUM_MSG	- Number of messages in the data burst stream.
31		The mobile station shall set this field to the number of
32		messages within this data burst stream.
33	NUM_FIELDS	- Number of characters in this message.
34		The mobile station shall set this field to the number of CHARi
35		fields included in this message.
36	CHARi	- Character.
37		The mobile station shall include NUM_FIELDS occurrences of
38		this field. The mobile station shall set these fields to the
39		corresponding octet of the data burst stream.

1 If the BURST TYPE field of this message is equal to '111111',  
2 the first two CHARi octets shall represent a single, 16 bit,  
3 EXTENDED BURST TYPE field, as shown below. The mobile  
4 station shall set the value of the EXTENDED BURST TYPE  
5 according to the type of this data burst as defined in TSB58,  
6 *Administration of Parameter Value Assignments for TIA/EIA*  
7 *Wideband Spread Spectrum Standards*.

Field	Length (bits)
EXTENDED_BURST_TYPE (first two CHARi fields)	16
Remaining CHARi fields	8 x (NUM_FIELDS - 2)

1 6.7.1.3.2.4 Origination Message

2 When the mobile station sends an *Origination Message*, it shall use the following variable-  
 3 length message format:

4

Field	Length (bits)
MSG_TYPE ('00000100')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ACK_TYPE	3
MSID_TYPE	3
MSID_LEN	4
MSID	8 × MSID_LEN
AUTH_MODE	2
AUTHR	0 or 18
RANDC	0 or 8
COUNT	0 or 6
MOB_TERM	1
SLOT_CYCLE_INDEX	3
MOB_P_REV	8
SCM	8
REQUEST_MODE	3
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16
PM	1
DIGIT_MODE	1
NUMBER_TYPE	0 or 3
NUMBER_PLAN	0 or 4

(continues on next page)

Field	Length (bits)
MORE_FIELDS	1
NUM_FIELDS	8

NUM\_FIELDS occurrences of the following field:

CHAR	4 or 8
------	--------

NAR_AN_CAP	1
RESERVED	0 - 7 (as needed)

- MSG\_TYPE - Message type.  
The mobile station shall set this field to '00000100'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 6.7.1.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 6.7.1.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 6.7.1.3.1.1.
- VALID\_ACK - Valid acknowledgement indicator.  
See 6.7.1.3.1.1.
- ACK\_TYPE - Acknowledgement address type.  
See 6.7.1.3.1.1.
- MSID\_TYPE - Mobile station identifier field type.  
See 6.7.1.3.1.1.
- MSID\_LEN - Mobile station identifier field length.  
See 6.7.1.3.1.1.
- MSID - Mobile station identifier.  
See 6.7.1.3.1.1.
- AUTH\_MODE - Authentication mode.  
See 6.7.1.3.1.2.
- AUTHR - Authentication data.  
See 6.7.1.3.1.2.
- RANDC - Random challenge value.  
See 6.7.1.3.1.2.

- 1                   COUNT   - Call history parameter.  
2                                   See 6.7.1.3.1.2.
- 3                   MOB\_TERM   - Mobile terminated calls accepted indicator.  
4                                   If the mobile station is configured to accept mobile terminated  
5                                   calls while operating with the current roaming status (see  
6                                   6.6.5.3), the mobile station shall set this bit to '1'. Otherwise,  
7                                   the mobile station shall set this bit to '0'.
- 8                   SLOT\_CYCLE\_INDEX   - Slot cycle index.  
9                                   If the mobile station is configured for slotted mode operation,  
10                                  the mobile station shall set this field to the preferred slot cycle  
11                                  index, SLOT\_CYCLE\_INDEX<sub>p</sub> (see 6.6.2.1.1). Otherwise, the  
12                                  mobile station shall set this field to '000'.
- 13                  MOB\_P\_REV   - Protocol revision of the mobile station.  
14                                  The mobile station shall set this field to '00000010'.
- 15                  SCM         - Station class mark.  
16                                  The mobile station shall set this field to the station class mark  
17                                  of the mobile station. See 2.3.3.
- 18                  REQUEST\_MODE   - Requested mode code. The mobile station shall set this field  
19                                  to the value shown in Table 6.7.1.3.2.4-1 corresponding to its  
20                                  current configuration.

Table 6.7.1.3.2.4-1. REQUEST\_MODE Codes

Value (binary)	Requested Mode
000	Reserved
001	CDMA only
010	Wide analog only
011	Either wide analog or CDMA only
100	Narrow analog only
101	Either narrow analog or CDMA only
110	Either narrow analog or wide analog only
111	Narrow analog or wide analog or CDMA

- 23
- 24                  SPECIAL\_SERVICE   - Special service option indicator.  
25                                  To request a special service option, the mobile station shall set  
26                                  this field to '1'. To request the default service option (Service  
27                                  Option 1), the mobile station shall set this field to '0'.
- 28                  SERVICE\_OPTION   - Requested service option for this origination.

If the SPECIAL\_SERVICE field is set to '1', the mobile station shall set this field to the value shown in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*, corresponding to the requested service option. If the SPECIAL\_SERVICE field is set to '0', the mobile station shall omit this field.

PM - Privacy mode indicator.

To request voice privacy, the mobile station shall set this field to '1'. Otherwise, the mobile station shall set this field to '0'.

DIGIT\_MODE - Digit mode indicator.

This field indicates whether the dialed digits are 4-bit DTMF codes using the Unknown numbering plan, or 8-bit ASCII codes using a specified numbering plan.

To originate the call using the binary representation of DTMF digits, the mobile station shall set this field to '0'. To originate the call using ASCII characters, the mobile station shall set this field to '1'.

NUMBER\_TYPE - Type of number.

If the DIGIT\_MODE field is set to '1', the mobile station shall set this field to the NUMBER\_TYPE value shown in Table 6.7.1.3.2.4-2 corresponding to the type of the number as defined in ANSI T1.607 §4.5.9. If the DIGIT\_MODE field is set to '0', the mobile station shall omit this field.

Table 6.7.1.3.2.4-2. Number Types

Description	NUMBER_TYP (binary)
Unknown	000
International number	001
National number	010
Network-specific number	011
Subscriber number	100
Reserved	101
Abbreviated number	110
Reserved for extension	111

NUMBER\_PLAN - Numbering plan.

If the DIGIT\_MODE field is set to '1', the mobile station shall set this field to the NUMBER\_PLAN value shown in Table 6.7.1.3.2.4-3 corresponding to the requested numbering plan. If the DIGIT\_MODE field is set to '0', the mobile station shall omit this field.

**Table 6.7.1.3.2.4-3. Numbering Plan Identification**  
**(DIGIT\_MODE = '1') (See ANSI T1.607 §4.5.9)**

Description	NUMBER_PLAN (binary)
Unknown	0000
ISDN/Telephony numbering plan (CCITT E.164 and CCITT E.163)	0001
Data numbering plan (CCITT X.121)	0011
Telex numbering plan (CCITT F.69)	0100
Private numbering plan	1001
Reserved for extension	1111
All other NUMBER_PLAN codes are reserved.	

**MORE\_FIELDS** - More dialed digits indicator.

This field indicates whether additional dialed digits will be sent in a later *Origination Continuation Message*.

If all dialed digits will fit in this message, the mobile station shall set this field to '0'. If not, the mobile station shall set this field to '1'.

**NUM\_FIELDS** - Number of dialed digits in this message.

The mobile station shall set this field to the number of dialed digits included in this message.

**CHAR** - A dialed digit or character.

The mobile station shall include NUM\_FIELDS occurrences of this field. If the DIGIT\_MODE field is set to '0', the mobile station shall set each occurrence of this field to the code value shown in Table 6.7.1.3.2.4-4 corresponding to the dialed digit. If the DIGIT\_MODE field is set to '1', the mobile station shall set each occurrence of this field to the ASCII representation corresponding to the dialed digit, as specified in ANSI X3.4, with the most significant bit set to '0'.



Table 6.7.1.3.2.4-4. Representation of DTMF Digits

Digit	Code (binary)	Digit	Code (binary)
1	0001	7	0111
2	0010	8	1000
3	0011	9	1001
4	0100	0	1010
5	0101	*	1011
6	0110	#	1100
All other codes are reserved.			

NAR\_AN\_CAP - Narrow analog capability.

If the mobile station is capable of a CDMA to narrow analog handoff, the mobile station shall set this bit to '1'. Otherwise, the mobile station shall set this bit to '0'.

RESERVED - Reserved bits.

The mobile station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The mobile station shall set these bits to '0'.

1 6.7.1.3.2.5 Page Response Message

2 When the mobile station sends a *Page Response Message*, it shall use the following  
3 variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000101')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ACK_TYPE	3
MSID_TYPE	3
MSID_LEN	4
MSID	8 × MSID_LEN
AUTH_MODE	2
AUTHR	0 or 18
RANDC	0 or 8
COUNT	0 or 6
MOB_TERM	1
SLOT_CYCLE_INDEX	3
MOB_P_REV	8
SCM	8
REQUEST_MODE	3
SERVICE_OPTION	16
PM	1
NAR_AN_CAP	1
RESERVED	5

- 5
- 6 MSG\_TYPE - Message type.  
7 The mobile station shall set this field to '00000101'.
- 8 ACK\_SEQ - Acknowledgement sequence number.  
9 See 6.7.1.3.1.1.
- 10 MSG\_SEQ - Message sequence number.  
11 See 6.7.1.3.1.1.

1	ACK_REQ	- Acknowledgement required indicator.
2		See 6.7.1.3.1.1.
3	VALID_ACK	- Valid acknowledgement indicator.
4		See 6.7.1.3.1.1.
5	ACK_TYPE	- Acknowledgement address type.
6		See 6.7.1.3.1.1.
7	MSID_TYPE	- Mobile station identifier field type.
8		See 6.7.1.3.1.1.
9	MSID_LEN	- Mobile station identifier field length.
10		See 6.7.1.3.1.1.
11	MSID	- Mobile station identifier.
12		See 6.7.1.3.1.1.
13	AUTH_MODE	- Authentication mode.
14		See 6.7.1.3.1.2.
15	AUTHR	- Authentication data.
16		See 6.7.1.3.1.2.
17	RANDC	- Random challenge value.
18		See 6.7.1.3.1.2.
19	COUNT	- Call history parameter.
20		See 6.7.1.3.1.2.
21	MOB_TERM	- Mobile terminated calls accepted indicator.
22		If the mobile station is configured to accept mobile terminated
23		calls while operating with the current roaming status (see
24		6.6.5.3), the mobile station shall set this bit to '1'. Otherwise,
25		the mobile station shall set this bit to '0'.
26	SLOT_CYCLE_INDEX	- Slot cycle index.
27		If the mobile station is configured for slotted mode operation,
28		the mobile station shall set this field to the preferred slot cycle
29		index, SLOT_CYCLE_INDEX <sub>p</sub> (see 6.6.2.1.1). Otherwise, the
30		mobile station shall set this field to '000'.
31	MOB_P_REV	- Protocol revision of the mobile station.
32		The mobile station shall set this field to "00000010".
33	SCM	- Station class mark.
34		The mobile station shall set this field to the station class mark
35		of the mobile station. See 2.3.3.
36	REQUEST_MODE	- Requested mode code. The mobile station shall set this field
37		to the value shown in Table 6.7.1.3.2.4-1 corresponding to its
38		current configuration.

1	SERVICE_OPTION	- Service option.
2		If the mobile station accepts the service option specified in the
3		<i>Page Message</i> or <i>Slotted Page Message</i> , it shall set this field to
4		the service option number specified in that message if that
5		message contained an explicit service option field, or to
6		'0000000000000001' (the default service option number) if the
7		<i>General Page Message</i> , <i>Page Message</i> , or <i>Slotted Page</i>
8		<i>Message</i> did not contain a service option field.
9		
10		If the mobile station does not accept the service option
11		specified in the <i>General Page Message</i> , <i>Page Message</i> , or
12		<i>Slotted Page Message</i> and has an alternative service option to
13		request, it shall set this field to the service option code shown
14		in TSB58, <i>Administration of Parameter Value Assignments for</i>
15		<i>TIA/EIA Wideband Spread Spectrum Standards</i> ,
16		corresponding to the alternative service option.
17		
18		If the mobile station does not accept the service option
19		specified in the <i>General Page Message</i> , <i>Page Message</i> , or
20		<i>Slotted Page Message</i> and does not have an alternative service
21		option to request, the mobile station shall set this field to
22		'0000000000000000' to reject the service option specified by
23		the <i>General Page Message</i> , <i>Page Message</i> , or <i>Slotted Page</i>
24		<i>Message</i> .
25	PM	- Privacy mode indicator.
26		To request voice privacy, the mobile station shall set this field
27		to '1'. Otherwise, the mobile station shall set this field to '0'.
28	NAR_AN_CAP	- Narrow analog capability.
29		If the mobile station is capable of a CDMA to narrow analog
30		handoff, the mobile station shall set this bit to '1'. Otherwise,
31		the mobile station shall set this bit to '0'.
32	RESERVED	- Reserved bits.
33		The mobile station shall set this field to '00000'.

1 6.7.1.3.2.6 Authentication Challenge Response Message

2 When the mobile station sends an *Authentication Challenge Response Message* on the  
 3 Access Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00000110')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ACK_TYPE	3
MSID_TYPE	3
MSID_LEN	4
MSID	8 × MSID_LEN
RESERVED	2
AUTHU	18

RESERVED	4
----------	---

- 5
- 6 MSG\_TYPE - Message type.  
 7 The mobile station shall set this field to '00000110'.
- 8 ACK\_SEQ - Acknowledgement sequence number.  
 9 See 6.7.1.3.1.1.
- 10 MSG\_SEQ - Message sequence number.  
 11 See 6.7.1.3.1.1.
- 12 ACK\_REQ - Acknowledgement required indicator.  
 13 See 6.7.1.3.1.1.
- 14 VALID\_ACK - Valid acknowledgement indicator.  
 15 See 6.7.1.3.1.1.
- 16 ACK\_TYPE - Acknowledgement address type.  
 17 See 6.7.1.3.1.1.
- 18 MSID\_TYPE - Mobile station identifier field type.  
 19 See 6.7.1.3.1.1.

1	MSID_LEN	-	Mobile station identifier field length.
2			See 6.7.1.3.1.1.
3	MSID	-	Mobile station identifier.
4			See 6.7.1.3.1.1.
5	RESERVED	-	Reserved bits.
6			These bits take the place of the AUTH_MODE field.
7			The mobile station shall set this field to '00'.
8	AUTHU	-	Authentication challenge response.
9			The mobile station shall set this field as specified in
10			6.3.12.1.5.
11	RESERVED	-	Reserved bits.
12			The mobile station shall set this field to '0000'.

## 6.7.2 Reverse Traffic Channel

During Traffic Channel operation, the mobile station sends signaling messages to the base station using the Reverse Traffic Channel.

### 6.7.2.1 Reverse Traffic Channel Structure

When sending a Reverse Traffic Channel message, the mobile station shall send it as signaling traffic using the signaling traffic formats specified in 6.1.3.3.11. The mobile station may use one or more Reverse Traffic Channel frames to send the message.

The first signaling traffic bit in a Reverse Traffic Channel frame shall be a Start of Message (SOM) Bit. The mobile station shall set this bit to '1' if a Reverse Traffic Channel message begins in the frame, or to '0' if the frame contains bits of a Reverse Traffic Channel message that began in a previous frame. The mobile station shall use the remaining signaling traffic bits of the frame to send Reverse Traffic Channel message bits. If the frame used to send the last bits of a message contains any unused signaling traffic bits, the mobile station shall set each of these bits, referred to as padding bits, to '0'.

### 6.7.2.2 Reverse Traffic Channel Message Structure

A Reverse Traffic Channel message shall consist of a length field (MSG\_LENGTH), a message body, and a CRC field, in that order (see Figure 6.7.2.2-1).

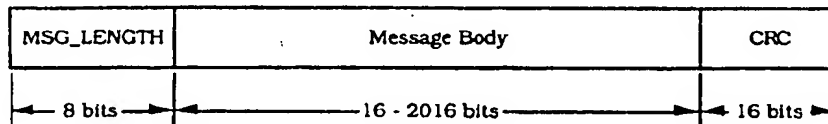


Figure 6.7.2.2-1. Reverse Traffic Channel Message Structure

#### 6.7.2.2.1 Reverse Traffic Channel Message MSG\_LENGTH Field

The mobile station shall set the MSG\_LENGTH field of a Reverse Traffic Channel message to the length, in octets, of the message, including the MSG\_LENGTH field, the message body and the CRC field. The MSG\_LENGTH field shall be 8 bits in length. The minimum value of the MSG\_LENGTH field shall be 5.<sup>27</sup>

#### 6.7.2.2.2 Reverse Traffic Channel Message CRC Field

The mobile station shall set the CRC field of a Reverse Traffic Channel message to the CRC computed for the message. The CRC computation shall include the MSG\_LENGTH field and the message body. The CRC field shall be 16 bits in length.

<sup>27</sup>This accommodates the MSG\_LENGTH field, the layer 2 fields present in the Message Body, and the CRC field.

- 1 The generator polynomial for the CRC shall be the standard CRC-CCITT polynomial:
- 2 
$$g(x) = x^{16} + x^{12} + x^5 + 1.$$
- 3 The CRC shall be equal to the value computed by the following procedure and the logic
- 4 shown in Figure 6.7.2.2-1:
- 5 • All shift register elements shall be initialized to logical one.<sup>28</sup>
  - 6 • The switches shall be set in the up position.
  - 7 • The information bit count  $k$  shall be defined as 8 + message body length in bits.
  - 8 • The register shall be clocked  $k$  times, with the length and message body of the
  - 9 message as the  $k$  input bits.
  - 10 • The switches shall be set in the down position.
  - 11 • The register shall be clocked an additional 16 times.
  - 12 • The 16 additional output bits shall be the CRC field.
  - 13 • The bits shall be transmitted in the order in which they appear at the output of the
  - 14 CRC encoder.

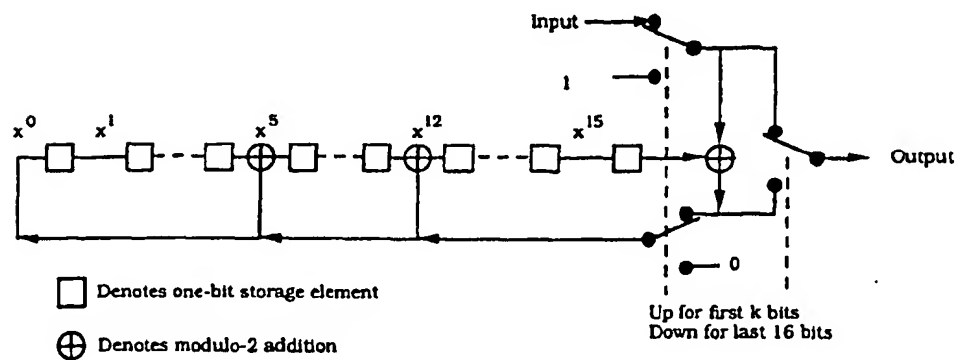


Figure 6.7.2.2-1. Reverse Traffic Channel Message CRC Calculation

<sup>28</sup>Initialization of the register to ones causes the CRC for all-zero data to be non-zero.



### 6.7.2.3 Reverse Traffic Channel Message Body Format

The Reverse Traffic Channel messages are summarized in Table 6.7.2.3-1.

**Table 6.7.2.3-1. Reverse Traffic Channel Messages**

Message Name	Message Type (binary)
<i>Order Message</i>	00000001
<i>Authentication Challenge Response Message</i>	00000010
<i>Flash With Information Message</i>	00000011
<i>Data Burst Message</i>	00000100
<i>Pilot Strength Measurement Message</i>	00000101
<i>Power Measurement Report Message</i>	00000110
<i>Send Burst DTMF Message</i>	00000111
<i>Status Message</i>	00001000
<i>Origination Continuation Message</i>	00001001
<i>Handoff Completion Message</i>	00001010
<i>Parameters Response Message</i>	00001011

#### 6.7.2.3.1 Common Fields

##### 6.7.2.3.1.1 Common Acknowledgement Fields

All Reverse Traffic Channel messages share the same three acknowledgement fields:

**ACK\_SEQ** - Acknowledgement sequence number.

The mobile station shall set this field to the value of the MSG\_SEQ field from the most recently received Forward Traffic Channel message requiring acknowledgement. If no such message has been received, the mobile station shall set this field to '111'. See 6.6.4.1.3.

**MSG\_SEQ** - Message sequence number.

The mobile station shall set this field to the message sequence number for this message. See 6.6.4.1.3.

**ACK\_REQ** - Acknowledgement required indicator.

This field indicates whether this message requires an acknowledgement.

To indicate that this message requires acknowledgement, the mobile station shall set this field to '1'. To indicate that this message does not require acknowledgement, the mobile station shall set this field to '0'.

1   **6.7.2.3.1.2 Common Encryption Field**

2   All Reverse Traffic Channel messages contain the following field:

3         **ENCRYPTION**    -   Message encryption indicator.

4                           The mobile station shall set this field to the current message  
5                           encryption mode, equal to the **ENCRYPT\_MODE** field of the  
6                           last received *Channel Assignment Message*, *Handoff Direction*  
7                           *Message* or *Message Encryption Mode Order*. The value of this  
8                           field and the encryption state of a message shall not change if  
9                           the same message is retransmitted.

10   **6.7.2.3.2 Message Body Contents**

11   The following sections specify the contents of the message body for each message that may  
12   be sent on the Reverse Traffic Channel.

1 6.7.2.3.2.1 Order Message

2 When the mobile station sends an *Order Message* on the Reverse Traffic Channel, it shall  
3 use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000001')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
ORDER	6
ADD_RECORD_LEN	3
Order-specific fields (if used)	8 × ADD_RECORD_LEN
RESERVED	6

- 5
- 6 MSG\_TYPE - Message type.  
7 The mobile station shall set this field to '00000001'.
- 8 ACK\_SEQ - Acknowledgement sequence number.  
9 See 6.7.2.3.1.1.
- 10 MSG\_SEQ - Message sequence number.  
11 See 6.7.2.3.1.1.
- 12 ACK\_REQ - Acknowledgement required indicator.  
13 See 6.7.2.3.1.1.
- 14 ENCRYPTION - Message encryption indicator.  
15 See 6.7.2.3.1.2.
- 16 ORDER - Order code.  
17 The mobile station shall set this field to the ORDER code.  
18 See 6.7.3.
- 19 ADD\_RECORD\_LEN - Additional record length.  
20 The mobile station shall set this field to the number of octets  
21 in the order-specific fields included in this message.
- 22 Order-specific fields - Order-specific fields.  
23 The mobile station shall include order-specific fields as  
24 specified in 6.7.3.
- 25 RESERVED - Reserved bits.  
26 The mobile station shall set this field to '000000'.

#### 6.7.2.3.2.2 Authentication Challenge Response Message

When the mobile station sends an *Authentication Challenge Response Message* on the Reverse Traffic Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00000010')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
AUTHU	18
RESERVED	5

MSG\_TYPE - Message type.

The mobile station shall set this field to '00000010'.

ACK\_SEQ - Acknowledgement sequence number.

See 6.7.2.3.1.1.

MSG\_SEQ - Message sequence number.

See 6.7.2.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 6.7.2.3.1.1.

ENCRYPTION - Message encryption indicator.

See 6.7.2.3.1.2.

AUTHU - Authentication challenge response.

The mobile station shall set this field as specified in 6.3.12.1.5.

RESERVED - Reserved bits.

The mobile station shall set this field to '00000'.

6.7.2.3.2.3 Flash With Information Message

When the mobile station sends a *Flash With Information Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000011')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2

Zero or more occurrences of the following record:

RECORD_TYPE	8
RECORD_LEN	8
Type-specific fields	8 × RECORD_LEN

RESERVED	7
----------	---

5

- 6 MSG\_TYPE - Message type.  
 7 The mobile station shall set this field to '00000011'.  
 8 ACK\_SEQ - Acknowledgement sequence number.  
 9 See 6.7.2.3.1.1.  
 10 MSG\_SEQ - Message sequence number.  
 11 See 6.7.2.3.1.1.  
 12 ACK\_REQ - Acknowledgement required indicator.  
 13 See 6.7.2.3.1.1.  
 14 ENCRYPTION - Message encryption indicator.  
 15 See 6.7.2.3.1.2.

16

17 The mobile station shall include one occurrence of the following record for each information  
 18 record to be included:

- 19 RECORD\_TYPE - Information record type.  
 20 The mobile station shall set this field to the record type code  
 21 shown in Table 6.7.4-1 corresponding to the type of this  
 22 information record.

- |   |                      |   |   |
|---|----------------------|---|---|
| 1 | RECORD_LEN           | - | Information record length.                                      |
| 2 |                      |   | The mobile station shall set this field to the number of octets |
| 3 |                      |   | in the type-specific fields of this record.                     |
| 4 | Type-specific fields | - | Type-specific fields.   |
| 5 |                      |   | The mobile station shall set these fields as specified in 6.7.4 |
| 6 |                      |   | for this type of information record.                            |
| 7 | RESERVED             | - | Reserved bits.  |
| 8 |                      |   | The mobile station shall set this field to '0000000'.           |

1 6.7.2.3.2.4 Data Burst Message

2 When the mobile station sends a *Data Burst Message* on the Reverse Traffic Channel, it  
 3 shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000100')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
MSG_NUMBER	8
BURST_TYPE	6
NUM_MSGS	8
NUM_FIELDS	8
NUM_FIELDS occurrences of the following field:	
CHAR	8
RESERVED	1

5

- 6 MSG\_TYPE - Message type.  
 7 The mobile station shall set this field to '00000100'.
- 8 ACK\_SEQ - Acknowledgement sequence number.  
 9 See 6.7.2.3.1.1.
- 10 MSG\_SEQ - Message sequence number.  
 11 See 6.7.2.3.1.1.
- 12 ACK\_REQ - Acknowledgement required indicator.  
 13 See 6.7.2.3.1.1.
- 14 ENCRYPTION - Message encryption indicator.  
 15 See 6.7.2.3.1.2.
- 16 MSG\_NUMBER - Message number within the data burst stream.  
 17 The mobile station shall set this field to the number of this  
 18 message within the data burst stream.

**BURST\_TYPE** - Data burst type.

The mobile station shall set the value of this field for the type of this data burst as defined in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*. If the mobile station sets this field equal to '111111', it shall set the first two CHARi fields of this message equal to the EXTENDED BURST TYPE as described in the definition of CHARi below.

**NUM\_MSGS** - Number of messages in the data burst stream.

The mobile station shall set this field to the number of messages within this data burst stream.

**NUM\_FIELDS** - Number of characters in this message.

The mobile station shall set this field to the number of CHARi fields included in this message.

**CHARi** - Character.

The mobile station shall include NUM\_FIELDS occurrences of this field. The mobile station shall set these fields to the corresponding octet of the data burst stream.

If the BURST TYPE field of this message is equal to '111111', the first two CHARi octets shall represent a single, 16 bit, EXTENDED BURST TYPE field, as shown below. The mobile station shall set the value of the EXTENDED BURST TYPE according to the type of this data burst as defined in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*.

Field	Length (bits)
EXTENDED_BURST_TYPE (first two CHARi fields)	16
Remaining CHARi fields	8 x (NUM_FIELDS - 2)

**RESERVED** - Reserved bits.

The mobile station shall set this field to '0'.



#### 6.7.2.3.2.5 Pilot Strength Measurement Message

When the mobile station sends a *Pilot Strength Measurement Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000101')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
REF_PN	9
PILOT_STRENGTH	6
KEEP	1

Zero or more occurrences of the following record:

PILOT_PN_PHASE	15
PILOT_STRENGTH	6
KEEP	1

RESERVED	0 - 7 (as needed)
----------	-------------------

- MSG\_TYPE - Message type.  
The mobile station shall set this field to '00000101'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 6.7.2.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 6.7.2.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 6.7.2.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 6.7.2.3.1.2.
- REF\_PN - Time reference PN sequence offset.  
The mobile station shall set this field to the PN sequence offset of the pilot used by the mobile station to derive its time reference, relative to the zero offset pilot PN sequence in units of 64 PN chips.

- 1       **PILOT\_STRENGTH**   - Pilot strength.  
2       The mobile station shall set this field to  
3        $\lfloor -2 \times 10 \times \log_{10} PS \rfloor$   
4       where PS is the strength of the pilot used by the mobile  
5       station to derive its time reference (see 6.1.5.1), measured as  
6       specified in 6.6.6.2.2. If this value is less than 0, the mobile  
7       station shall set this field to '000000'. If this value is greater  
8       than '111111', the mobile station shall set this field to  
9       '111111'.  
10       **KEEP**       - Keep pilot indicator.  
11       If the handoff drop timer (see 6.6.6.2.3) corresponding to the  
12       pilot used by the mobile station to derive its time reference  
13       (see 6.1.5.1) has expired, the mobile station shall set this field  
14       to '0'. Otherwise, the mobile station shall set this field to '1'.  
15  
16       The mobile station shall include one occurrence of the following three-field record for each  
17       pilot in the Active Set and for each pilot in the Candidate Set, other than the pilot identified  
18       by the REF\_PN field.  
19       **PILOT\_PN\_PHASE**   - Pilot measured phase.  
20       The mobile station shall set this field to the phase of the pilot  
21       PN sequence relative to the zero offset pilot PN sequence of  
22       this pilot, in units of one PN chip, as specified in 6.6.6.2.4.  
23       **PILOT\_STRENGTH**   - Pilot strength.  
24       The mobile station shall set this field to  
25        $\lfloor -2 \times 10 \times \log_{10} PS \rfloor$   
26       where PS is the strength of this pilot, measured as specified in  
27       6.6.6.2.2. If this value is less than 0, the mobile station shall  
28       set this field to '000000'. If this value is greater than  
29       '111111', the mobile station shall set this field to '111111'.  
30       **KEEP**       - Keep pilot indicator.  
31       If the handoff drop timer (see 6.6.6.2.3) corresponding to this  
32       pilot has expired, the mobile station shall set this field to '0'.  
33       Otherwise, the mobile station shall set this field to '1'.  
34  
35       **RESERVED**       - Reserved bits.  
36       The mobile station shall add reserved bits as needed in order  
37       to make the length of the entire message equal to an integer  
38       number of octets. The mobile station shall set these bits  
39       to '0'.

#### 6.7.2.3.2.6 Power Measurement Report Message

When the mobile station sends a *Power Measurement Report Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000110')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REG	1
ENCRYPTION	2
ERRORS_DETECTED	5
PWR_MEAS_FRAMES	10
LAST_HDM_SEQ	2
NUM_PILOTS	4
NUM_PILOTS occurrences of the following field:	
PILOT_STRENGTH	6
RESERVED	0 - 7 (as needed)

- MSG\_TYPE - Message type.  
The mobile station shall set this field to '00000110'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 6.7.2.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 6.7.2.3.1.1.
- ACK\_REG - Acknowledgement required indicator.  
See 6.7.2.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 6.7.2.3.1.2.
- ERRORS\_DETECTED - Number of frame errors detected.  
If the number of bad frames (see 6.2.2.2) received in the measurement period is less than or equal to 31, the mobile station shall set this field to that number (BAD\_FRAMES<sub>s</sub>, see 6.6.4.1.1). If that number exceeds 31, the mobile station shall set this field to '1111'.

1	PWR_MEAS_FRAMES	-	Number of Forward Traffic Channel frames in the measurement period.
2			
3			The mobile station shall set this field to the number of
4			Forward Traffic Channel frames in the measurement period
5			(TOT_FRAMES <sub>s</sub> , see 6.6.4.1.1).
6	LAST_HDM_SEQ	-	Handoff Direction Message sequence number.
7			If a Handoff Direction Message has been received during this
8			call, the mobile station shall set this field to the value of the
9			HDM_SEQ field from the Handoff Direction Message that
10			determined the current Active Set. If no Handoff Direction
11			Message has been received during this call, the mobile station
12			shall set this field to '11'.
13	NUM_PILOTS	-	Number of pilots reported.
14			The mobile station shall set this field to the number of pilots
15			in the current Active Set.
16	PILOT_STRENGTH	-	Pilot strength.
17			The mobile station shall include one occurrence of this field
18			for each pilot in the Active Set. If the Active Set contains more
19			than one pilot, the mobile station shall include the pilot
20			strengths in the same order as in the Handoff Direction
21			Message that determined the current Active Set.
22			The mobile station shall set each occurrence of this field to
23			$\lfloor -2 \times 10 \times \log_{10} PS \rfloor$ ,
24			where PS is the strength of the pilot, measured as specified in
25			6.6.6.2.2. If this value is less than 0, the mobile station shall
26			set this field to '000000'. If this value is greater than
27			'111111', the mobile station shall set this field to '111111'.
28	RESERVED	-	Reserved bits.
29			The mobile station shall add reserved bits as needed in order
30			to make the length of the entire message equal to an integer
31			number of octets. The mobile station shall set these bits
32			to '0'.

1 6.7.2.3.2.7 Send Burst DTMF Message

2 When the mobile station sends a *Send Burst DTMF Message*, it shall use the following  
3 variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000111')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
NUM_DIGITS	8
DTMF_ON_LENGTH	3
DTMF_OFF_LENGTH	3

NUM\_DIGITS occurrences of the following field:

DIGIT	4
-------	---

RESERVED	0 - 7 (as needed)
----------	-------------------

5

- 6 MSG\_TYPE - Message type.  
7 The mobile station shall set this field to '00000111'.  
8 ACK\_SEQ - Acknowledgement sequence number.  
9 See 6.7.2.3.1.1.  
10 MSG\_SEQ - Message sequence number.  
11 See 6.7.2.3.1.1.  
12 ACK\_REQ - Acknowledgement required indicator.  
13 See 6.7.2.3.1.1.  
14 ENCRYPTION - Message encryption indicator.  
15 See 6.7.2.3.1.2.  
16 NUM\_DIGITS - Number of DTMF digits.  
17 The mobile station shall set this field to the number of DTMF  
18 digits included in this message.  
19 DTMF\_ON\_LENGTH - DTMF pulse width code.  
20 The mobile station shall set this field to the DTMF\_  
21 ON\_LENGTH value shown in Table 6.7.2.3.2.7-1  
22 corresponding to the requested width of DTMF pulses to be  
23 generated by the base station.

Table 6.7.2.3.2.7-1. Recommended DTMF Pulse Width

DTMF_ON_LENGTH Field (binary)	Recommended Pulse Width
000	95 ms
001	150 ms
010	200 ms
011	250 ms
100	300 ms
101	350 ms
All other DTMF_ON_LENGTH codes are reserved.	

DTMF\_OFF\_LENGTH - DTMF interdigit interval code.

The mobile station shall set this field to the DTMF\_OFF\_LENGTH value shown in Table 6.7.2.3.2.7-2 corresponding to the requested minimum interval between DTMF pulses to be generated by the base station.

Table 6.7.2.3.2.7-2. Recommended Minimum Interdigit Interval

DTMF_OFF_LENGTH Field (binary)	Recommended Minimum Interdigit Interval
000	60 ms
001	100 ms
010	150 ms
011	200 ms
All other DTMF_OFF_LENGTH codes are reserved.	

DIGIT - DTMF digit.

The mobile station shall include one occurrence of this field for each DTMF digit to be generated by the base station. The mobile station shall set each occurrence of this field to the code value shown in Table 6.7.1.3.2.4-4 corresponding to the dialed digit.

RESERVED - Reserved bits.

The mobile station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The mobile station shall set these bits to '0'.

## 6.7.2.3.2.8 Status Message

When the mobile station sends a *Status Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001000')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
RECORD_TYPE	8
RECORD_LEN	8
Type-specific fields	8 × RECORD_LEN
RESERVED	7

MSG\_TYPE - Message type.

The mobile station shall set this field to '00001000'.

ACK\_SEQ - Acknowledgement sequence number.

See 6.7.2.3.1.1.

MSG\_SEQ - Message sequence number.

See 6.7.2.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 6.7.2.3.1.1.

ENCRYPTION - Message encryption indicator.

See 6.7.2.3.1.2.

RECORD\_TYPE - Information record type.

The mobile station shall set this field to the record type value shown in Table 6.7.4-1 corresponding to the type of this information record.

RECORD\_LEN - Information record length.

The mobile station shall set this field to the number of octets included in the type-specific fields of this information record.

Type-specific fields - Type-specific fields.

The mobile station shall set these fields as specified in 6.7.4 for this type of record.

- 1        **RESERVED**    -    Reserved bits.
- 2                       The mobile station shall set this field to '0000000'.



1 6.7.2.3.2.9 Origination Continuation Message

2 When the mobile station sends an *Origination Continuation Message*, it shall use the  
3 following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001001')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
DIGIT_MODE	1
NUM_FIELDS	8
NUM_FIELDS occurrences of the following field:	
CHAR <sub>i</sub>	4 or 8
RESERVED	0 - 7 (as needed)

- 5
- 6 MSG\_TYPE - Message type.  
7 The mobile station shall set this field to '00001001'.
- 8 ACK\_SEQ - Acknowledgement sequence number.  
9 See 6.7.2.3.1.1.
- 10 MSG\_SEQ - Message sequence number.  
11 See 6.7.2.3.1.1.
- 12 ACK\_REQ - Acknowledgement required indicator.  
13 See 6.7.2.3.1.1.
- 14 ENCRYPTION - Message encryption indicator.  
15 See 6.7.2.3.1.2.
- 16 DIGIT\_MODE - Digit mode indicator.  
17 The mobile station shall set this field to the DIGIT\_MODE  
18 value from the *Access Channel Origination Message* for which  
19 this message is a continuation.
- 20 NUM\_FIELDS - Number of dialed digits in this message.  
21 The mobile station shall set this field to the number of dialed  
22 digits included in this message.

1	CHAR	-	A dialed digit or character.
2			The mobile station shall include NUM_FIELDS occurrences of
3			this field. The mobile station shall include occurrences of this
4			field for all dialed digits after those sent in the Access Channel
5			<i>Origination Message</i> of which this message is a continuation.
6			If the DIGIT_MODE field is set to '0', the mobile station shall
7			set each occurrence of this field to the code value shown in
8			Table 6.7.1.3.2.4-4 corresponding to the dialed digit. If the
9			DIGIT_MODE field is set to '1', the mobile station shall set
10			each occurrence of this field to the ASCII representation
11			corresponding to the dialed digit, as specified in ANSI X3.4,
12			with the most significant bit set to '0'.
13	RESERVED	-	Reserved bits.
14			The mobile station shall add reserved bits as needed in order
15			to make the length of the entire message equal to an integer
16			number of octets. The mobile station shall set these bits
17			to '0'.

1    6.7.2.3.2.10 Handoff Completion Message

2    When the mobile station sends a *Handoff Completion Message*, it shall use the following  
 3    variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001010')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
LAST_HDM_SEQ	2

One or more occurrences of the following field:

PILOT_PN	9
----------	---

RESERVED	0 - 7 (as needed)
----------	-------------------

- 5
- 6        MSG\_TYPE    -    Message type.
- 7                    The mobile station shall set this field to '00001010'.
- 8        ACK\_SEQ    -    Acknowledgement sequence number.
- 9                    See 6.7.2.3.1.1.
- 10       MSG\_SEQ    -    Message sequence number.
- 11                   See 6.7.2.3.1.1.
- 12       ACK\_REQ    -    Acknowledgement required indicator.
- 13                   See 6.7.2.3.1.1.
- 14       ENCRYPTION -    Message encryption indicator.
- 15                   See 6.7.2.3.1.2.
- 16       LAST\_HDM\_SEQ - *Handoff Direction Message* sequence number.
- 17                   The mobile station shall set this field to the value of the
- 18                   HDM\_SEQ field from the *Handoff Direction Message* that
- 19                   determined the current Active Set.
- 20

- 1           PILOT\_PN   -   Pilot PN sequence offset.
- 2                           The mobile station shall include one occurrence of this field
- 3                           for each pilot in the current Active Set. The mobile station
- 4                           shall set this field to the pilot PN sequence offset, relative to
- 5                           the zero offset pilot PN sequence in units of 64 PN chips, for
- 6                           this pilot. If the Active Set contains more than one pilot, the
- 7                           mobile station shall include the pilot offsets in the same order
- 8                           as in the Handoff Direction Message that determined the
- 9                           current Active Set.
- 10          RESERVED   -   Reserved bits.
- 11                           The mobile station shall add reserved bits as needed in order
- 12                           to make the length of the entire message equal to an integer
- 13                           number of octets. The mobile station shall set these bits
- 14                           to '0'.

1 6.7.2.3.2.11 Parameters Response Message

2 When the mobile station sends a *Parameters Response Message*, it shall use the following  
 3 variable-length message format:

4

Field	Length (bits)
MSG_TYPE ('00001011')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2

One or more occurrences of the following record:

PARAMETER_ID	16
PARAMETER_LEN	10
PARAMETER	0 or PARAMETER_LEN + 1

RESERVED	0 - 7 (as needed)
----------	-------------------

- 5
- 6 MSG\_TYPE - Message type.  
 7 The mobile station shall set this field to '00001011'.
- 8 ACK\_SEQ - Acknowledgement sequence number.  
 9 See 6.7.2.3.1.1.
- 10 MSG\_SEQ - Message sequence number.  
 11 See 6.7.2.3.1.1.
- 12 ACK\_REQ - Acknowledgement required indicator.  
 13 See 6.7.2.3.1.1.
- 14 ENCRYPTION - Message encryption indicator.  
 15 See 6.7.2.3.1.2.  
 16

1 The mobile station shall include one occurrence of the following three-field record for each  
2 occurrence of the `PARAMETER_ID` field in the Forward Traffic Channel *Retrieve Parameters*  
3 *Message* to which this message is a response. See Appendix E.

4       `PARAMETER_ID`   - Parameter identification.

5                       The mobile station shall set this field to the value of the  
6 `PARAMETER_ID` field for this parameter from the *Retrieve*  
7 *Parameters Message* to which this message is a response.

8       `PARAMETER_LEN`   - Parameter length.

9                       The mobile station shall set this field to the length shown in  
10 Table E-1 corresponding to this `PARAMETER_ID`.

11                      If the mobile station is unable to return the value of this  
12 parameter, or if the parameter identification is unknown, the  
13 mobile station shall set this field to '11111111'.

14       `PARAMETER`   - Parameter value.

15                       The mobile station shall set this field equal to the value of the  
16 parameter identified by `PARAMETER` in Appendix E.

17                      If the mobile station is unable to return the value of this  
18 parameter, or if the parameter identification is unknown, the  
19 mobile station shall omit this field.

20

21       `RESERVED`   - Reserved bits.

22                       The mobile station shall add reserved bits as needed in order  
23 to make the length of the entire message equal to an integer  
24 number of octets. The mobile station shall set these bits  
25 to '0'.

### 1 6.7.3 Orders

2 *Order Messages* are sent by the mobile station on the Access Channel and on the Reverse  
3 Traffic Channel. The general format used on the Access Channel is defined in 6.7.1.3.2.2,  
4 and the general format used on the Reverse Traffic Channel is defined in 6.7.2.3.2.1. There  
5 are many specific types of *Order Messages*, as shown in Table 6.7.3-1.

6 The mobile station may send on the Access Channel any type of order shown in  
7 Table 6.7.3-1 with a 'Y' in the first column, but shall not send on the Access Channel any  
8 type of order with an 'N' in the first column. The mobile station may send on the Reverse  
9 Traffic Channel any type of order shown in Table 6.7.3-1 with a 'Y' in the second column,  
10 but shall not send on the Reverse Traffic Channel any type of order with an 'N' in the  
11 second column. The mobile station shall be capable of sending all types of orders shown in  
12 Table 6.7.3-1 with a 'Y' in the sixth column.

13 An order consists of a 6-bit order code and zero or more order-specific fields. The mobile  
14 station shall set the ORDER field in the *Order Message* to the order code shown in Table  
15 6.7.3-1 corresponding to the type of order being sent.

16 If the order qualification code in the fourth column of Table 6.7.3-1 is '00000000' and there  
17 are no other additional fields as shown by an 'N' in the fifth column, the mobile station  
18 shall include no order qualification code or other order-specific fields in the *Order Message*.  
19 The order qualification code of such a message is implicitly '00000000'.

20 If the order qualification code is not '00000000' and there are no other additional fields as  
21 shown in Table 6.7.3-1 by an 'N' in the fifth column, the mobile station shall include the  
22 order qualification code as the only order-specific field in the *Order Message*.

23 If there are other additional fields as shown in Table 6.7.3-1 by a 'Y' in the fifth column, the  
24 mobile station shall include order-specific fields as specified in the corresponding  
25 subsection of this section.

**Table 6.7.3-1. Order and Order Qualification Codes Used on the Reverse Traffic Channel and the Access Channel (Part 1 of 3)**

Access Channel Order	Reverse Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDg (binary)	More Fields other than ORDg	Support Req'd	Name/Function
Y	Y	000010	00000000	Y	Y	Base Station Challenge Order (see 6.7.3.1)
Y	Y	000011	00000000	N	Y	SSD Update Confirmation Order
Y	Y	000011	00000001	N	Y	SSD Update Rejection Order
N	Y	000101	0000nnnn	N	Y	Parameter Update Confirmation Order (where 'nnnn' is the Request Number)
N	Y	001011	00000000	N	N	Request Wide Analog Service Order
N	Y	001011	00000001	N	N	Request Narrow Analog Service Order
N	Y	001011	00000010	N	N	Request Analog Service Order
Y	Y	010000	00000000	N	Y	Mobile Station Acknowledgement Order
N	Y	010011	00000000	Y	N	Service Option Request Order (see 6.7.3.2)
N	Y	010100	00000000	Y	Y	Service Option Response Order (see 6.7.3.3)
N	Y	010101	00000000	N	Y	Release Order (normal release)
N	Y	010101	00000001	N	Y	Release Order (with power-down indication)
N	Y	010111	00000000	N	N	Long Code Transition Request Order (request public)
N	Y	010111	00000001	N	N	Long Code Transition Request Order (request private)



**Table 6.7.3-1. Order and Order Qualification Codes Used on the Reverse Traffic Channel and the Access Channel (Part 2 of 3)**

Access Channel Order	Reverse Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDQ (binary)	More Fields other than ORDQ	Support Req'd	Name/Function
N	Y	010111	00000010	N	Y	Long Code Transition Response Order (use public)
N	Y	010111	00000011	N	N	Long Code Transition Response Order (use private)
N	Y	011000	00000000	N	Y	Connect Order
N	Y	011001	0000nnnn	N	Y	Continuous DTMF Tone Order (where 'nnnn' is the tone per Table 6.7.1.3.2.4-4).
N	Y	011001	11111111	N	Y	Continuous DTMF Tone Order (Stop continuous DTMF tone)
N	Y	011101	nnnnnnnn	N	Y	Service Option Control Order (the specific control is designated by 'nnnnnnnn' as determined by each service option)
Y	Y	011110	nnnnnnnn	N	N	Local Control Response Order (specific response as designated by 'nnnnnnnn' as determined by each system)
Y	Y	011111	00000001	Y	Y	Mobile Station Reject Order (unspecified reason; see 6.7.3.4)
N	Y	011111	00000010	Y	Y	Mobile Station Reject Order (message not accepted in this state; see 6.7.3.4)
Y	Y	011111	00000011	Y	Y	Mobile Station Reject Order (message structure not acceptable; see 6.7.3.4)
Y	Y	011111	00000100	Y	Y	Mobile Station Reject Order (message field not in valid range; see 6.7.3.4)

**Table 6.7.3-1. Order and Order Qualification Codes Used on the Reverse Traffic Channel and the Access Channel (Part 3 of 3)**

Access Channel Order	Reverse Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDQ (binary)	More Fields other than ORDQ	Support Req'd	Name/Function
N	Y	011111	00000101	Y	Y	<i>Mobile Station Reject Order</i> (message type or order code not understood; see 6.7.3.4)
Y	Y	011111	00000110	Y	Y	<i>Mobile Station Reject Order</i> (message requires a capability that is not supported by the mobile station; see 6.7.3.4)
Y	Y	011111	00000111	Y	Y	<i>Mobile Station Reject Order</i> (message cannot be handled by the current mobile station configuration; see 6.7.3.4)
All other codes are reserved.						

## 1    6.7.3.1 Base Station Challenge Order

2    When the mobile station sends a *Base Station Challenge Order*, it shall use the following  
3    fixed-length format for the order-specific fields:

4

Order-Specific Field	Length (bits)
ORDQ	8
RANDBS	32

5

6            ORDQ    -    Order qualification code.

7                      The mobile station shall set this field to '00000000'.

8            RANDBS    -    Random challenge data.

9                      The mobile station shall set this field as specified in  
10                      6.3.12.1.9.

## 6.7.3.2 Service Option Request Order

When the mobile station sends a *Service Option Request Order*, it shall use the following fixed-length format for the order-specific fields:

Order-Specific Field	Length (bits)
ORDQ	8
SERVICE_OPTION	16

ORDQ - Order qualification code.

The mobile station shall set this field to '00000000'.

SERVICE\_OPTION - Service option.

The mobile station shall set this field to the service option code shown in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*, corresponding to the requested or alternative service option.

## 1 6.7.3.3 Service Option Response Order

2 When the mobile station sends a *Service Option Response Order*, it shall use the following  
3 fixed-length format for the order-specific fields:

Order-Specific Field	Length (bits)
ORDQ	8
SERVICE_OPTION	16

5

6       ORDQ   -   Order qualification code.

7               The mobile station shall set this field to '00000000'.

8       SERVICE\_OPTION   -   Service option.

9               The mobile station shall set this field to the service option  
10              code shown in TSB58, *Administration of Parameter Value*  
11              *Assignments for TIA/EIA Wideband Spread Spectrum*  
12              *Standards*, corresponding to the accepted service option, or to  
13              '0000000000000000' to reject the proposed service option.  
14              See 6.6.4.1.2.2.1.

#### 6.7.3.4 Mobile Station Reject Order

The *Mobile Station Reject Order* can be sent on either the Access Channel or the Reverse Traffic Channel. The mobile station shall use the following variable-length format for the order-specific fields:

Order-Specific Field	Length (bits)
ORDQ	8
REJECTED_TYPE	8

If the order is sent on the Access Channel and

REJECTED\_TYPE is '00000111'

or if the order is sent on the Reverse Traffic Channel and

REJECTED\_TYPE is '00000001'

the order-specific fields also include the following two fields:

REJECTED_ORDER	8
REJECTED_ORDQ	8

If the order is sent on the Reverse Traffic Channel and

REJECTED\_TYPE is '00001100'

the order-specific fields also include the following field:

REJECTED_PARAM_ID	16
-------------------	----

If the order is sent on the Access Channel and

REJECTED\_TYPE is '00001100'

or if the order is sent on the Reverse Traffic Channel and

REJECTED\_TYPE is '00000011' or

REJECTED\_TYPE is '00001110'

the order-specific fields also include the following field:

REJECTED_RECORD	8
-----------------	---

- ORDQ - Order qualification code.  
The mobile station shall set this field to the ORDQ value shown in Table 6.7.3-1 corresponding to the reason for rejecting the message.
- REJECTED\_TYPE - Message type of rejected message.  
The mobile station shall set this field to the value of the MSG\_TYPE field of the message being rejected.
- REJECTED\_ORDER - Order type of rejected message.  
If the rejected message was an *Order Message*, the mobile station shall set this field to the value of the ORDER field in the rejected message; otherwise the mobile station shall omit this field.

- 1       REJECTED\_ORDQ   -   Order qualification code of rejected message.  
2  
3       If the rejected message was an *Order Message* including an  
4       ORDQ field, the mobile station shall set this field to the value  
5       of the ORDQ field in the rejected message. If the rejected  
6       message was an *Order Message* not including an ORDQ field,  
7       the mobile station shall set this field to '00000000'; otherwise  
8       the mobile station shall omit this field.
- 9       REJECTED\_PARAM\_ID   -   Parameter identification of the rejected parameter.  
10  
11       If the rejected message was a *Set Parameters Message*, the  
12       mobile station shall set this field to the PARAMETER\_ID of the  
13       first parameter for which the requested operation could not be  
14       completed; otherwise the mobile station shall omit this field.
- 15       REJECTED\_RECORD   -   Record type of the rejected information record.  
16  
17       If the rejected message was a *Feature Notification Message*, an  
18       *Alert With Information Message* or a *Flash With Information*  
19       *Message*, the mobile station shall set this field to the  
20       RECORD\_TYPE field of the first information record that could  
21       not be accepted; otherwise the mobile station shall omit this  
22       field.

#### 6.7.4 Reverse Traffic Channel Information Records

On the Reverse Traffic Channel, information records may be included in the *Flash With Information Message* or the *Status Message*. Table 6.7.4-1 lists the information record type values that may be used with each message type. The following sections describe the contents of each of the record types in detail.

**Table 6.7.4-1. Information Record Types**

Message Type	Information Record	Record Type (binary)
None	Reserved	00000001
Flash	Feature Indicator	00000010
Flash	Keypad Facility	00000011
Flash	Called Party Number	00000100
Flash	Calling Party Number	00000101
Status	Reserved	00000110
Status	Call Mode	00000111
Status	Terminal Information	00001000
Status	Roaming Information	00001001
Status	Security Status	00001010
Flash	Connected Number	00001011
Status	IMSI	00001100
Status	ESN	00001101
All other record type values are reserved.		



## 1 6.7.4.1 Feature Indicator

2 This information record allows the user to invoke supplementary services and features. The  
3 mobile station shall use the following fixed-length format for the type-specific fields:

Type-Specific Field	Length (bits)
FEATURE	4
RESERVED	4

4

5

6

FEATURE - Feature Identifier.

7

8

This field identifies the supplementary service or feature to be  
invoked. Field values are for further study.

9

The mobile station shall set this field to the feature identifier.

10

RESERVED - Reserved bits.

11

The mobile station shall set this field to '0000'.

## 1 6.7.4.2 Keypad Facility

2 This information record allows the user to send characters entered via a keyboard or other  
3 such terminal. The mobile station shall use the following variable-length format for the  
4 type-specific fields:

Type-Specific Field	Length (bits)
One or more occurrences of the following field:	
CHARi	8

5

6

7

8

9

10

11

12

13

14

CHARi - Character.

The mobile station shall include one occurrence of this field for each character entered. The mobile station shall set each occurrence of this field to the ASCII representation corresponding to the character entered, as specified in ANSI X3.4, with the most significant bit set to '0'.

### 6.7.4.3 Called Party Number

This information record identifies the called party's number. The mobile station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4

Zero or more occurrences of the following field:

CHAR	8
------	---

RESERVED	1
----------	---

5

6

NUMBER\_TYPE - Type of number.

7

8

9

The mobile station shall set this field to the NUMBER\_TYPE value shown in Table 6.7.1.3.2.4-2 corresponding to the type of the called number, as defined in ANSI T1.607 §4.5.9.

10

NUMBER\_PLAN - Numbering plan.

11

12

13

14

The mobile station shall set this field to the NUMBER\_PLAN value shown in Table 6.7.1.3.2.4-3 corresponding to the numbering plan used for the called number, as defined in ANSI T1.607 §4.5.9.

15

CHAR - Character.

16

17

18

19

20

The mobile stations shall include one occurrence of this field for each character in the called number. The mobile station shall set each occurrence of this field to the ASCII representation corresponding to the character, as specified in ANSI X3.4, with the most significant bit set to '0'.

21

RESERVED - Reserved bits.

22

The mobile station shall set this field to '0'.

#### 6.7.4.4 Calling Party Number

This information record identifies the calling party's number. The mobile station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4
PI	2
SI	2

Zero or more occurrences of the following field:

CHAR	8
------	---

RESERVED	5
----------	---

**NUMBER\_TYPE** - Type of number.

The mobile station shall set this field to the **NUMBER\_TYPE** value shown in Table 6.7.1.3.2.4-2 corresponding to the type of the calling number as defined in ANSI T1.607 §4.5.9.

**NUMBER\_PLAN** - Numbering plan.

The mobile station shall set this field to the **NUMBER\_PLAN** value shown in Table 6.7.1.3.2.4-3 corresponding to the numbering plan used for the calling number, as defined in ANSI T1.607 §4.5.9.

**PI** - Presentation indicator.

This field indicates whether or not the calling number should be displayed.

The mobile station shall set this field to the **PI** value shown in Table 6.7.4.4-1 corresponding to the presentation indicator as defined in ANSI T1.607 §4.5.9.

Table 6.7.4.4-1. Presentation Indicators

Description	PI (binary)
Presentation allowed	00
Presentation restricted	01
Number not available	10
Reserved	11

SI - Screening indicator.

This field indicates how the calling number was screened.

The mobile station shall set this field to the SI value shown in Table 6.7.4.4-2 corresponding to the screening indicator value as defined in ANSI T1.607 §4.5.9.

Table 6.7.4.4-2. Screening Indicators

Description	SI (binary)
User-provided, not screened	00
User-provided, verified and passed	01
User-provided, verified and failed	10
Network-provided	11

CHARi - Character.

The mobile stations shall include one occurrence of this field for each character in the calling number. The mobile station shall set each occurrence of this field to the ASCII representation corresponding to the character, as specified in ANSI X3.4, with the most significant bit set to '0'.

RESERVED - Reserved bits.

The mobile station shall set this field to '00000'.

## 6.7.4.5 Reserved

## 6.7.4.6 Call Mode

This information record can be included in a *Status Message* to return the mobile station's preferred call mode and call-related information. The mobile station shall use the following fixed-length format for the type-specific fields:

Type-Specific Field	Length (bits)
ORIG_MODE	1
PRI_SERVICE	16
SEC_SERVICE	16
RESERVED	7

**ORIG\_MODE** - Origination mode indicator.

If the current call is a mobile-originated call, the mobile station shall set this field to '0'. If the current call is a mobile-terminated call, the mobile station shall set this field to '1'.

**PRI\_SERVICE** - Primary service option.

The mobile station shall set this field to the value shown in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*, corresponding to the current primary service option. If no primary service option is active, the mobile station shall set this field to '0000000000000000'.

**SEC\_SERVICE** - Secondary service option.

The mobile station shall set this field to the value shown in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*, corresponding to the current secondary service option. If no secondary service option is active, the mobile station shall set this field to '0000000000000000'.

**RESERVED** - Reserved bits.

The mobile station shall set this field to '0000000'.

#### 6.7.4.7 Terminal Information

This information record can be included in a *Status Message* to return configuration information about the mobile station. The mobile station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
MOB_P_REV	8
MOB_MFG_CODE	8
MOB_MODEL	8
MOB_FIRM_REV	16
SCM	8
LOCAL_CTRL	1
SLOT_CYCLE_INDEX	3

One or more occurrences of the following field:

SERVICE_OPTION	16
----------------	----

RESERVED	4
----------	---

- MOB\_P\_REV - Protocol revision of the mobile station.  
The mobile station shall set this field to '00000010'.
- MOB\_MFG\_CODE - Manufacturer code.  
This field identifies the manufacturer of the mobile station.  
The mobile station shall set this field to the manufacturer code assigned to its manufacturer.
- MOB\_MODEL - Model number.  
This number is assigned by the manufacturer for a particular model.  
The mobile station shall set this field to the model number assigned by the manufacturer for this mobile station.
- MOB\_FIRM\_REV - Firmware revision number.  
This number is assigned by the manufacturer for a particular firmware version.  
The mobile station shall set this field to the revision number assigned by the manufacturer for the firmware version running in this mobile station.

1	SCM	-	Station class mark.
2			The mobile station shall set this field to its station class mark.
3			See 2.3.3.
4	LOCAL_CTRL	-	Local control indicator.
5			If local control is enabled, the mobile station shall set this
6			field to '1'. If local control is disabled, the mobile station shall
7			set this field to '0'. See 2.6.1.2.2.
8	SLOT_CYCLE_INDEX	-	Slot cycle index.
9			If the mobile station is configured for slotted mode operation,
10			the mobile station shall set this field to the preferred slot cycle
11			index, SLOT_CYCLE_INDEX <sub>p</sub> (see 6.6.2.1.1). Otherwise, the
12			mobile station shall set this field to '000'.
13	SERVICE_OPTION	-	Supported service option.
14			The mobile station shall include one occurrence of this field
15			for each service option supported by the mobile station.
16	RESERVED	-	Reserved bits.
17			The mobile station shall set this field to '0000'.



#### 6.7.4.8 Roaming Information

This information record can be included in a *Status Message* to return roaming information about the mobile station. The mobile station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
ACCOLC	4
MOB_TERM_HOME	1
MOB_TERM_FOR_SID	1
MOB_TERM_FOR_NID	1

Zero or more occurrences of the following record:

SID	15
NID	16

RESERVED	0-7 (as needed)
----------	-----------------

ACCOLC - Overload class.

The mobile station shall set this field to the access overload class assigned to the mobile station.

MOB\_TERM\_HOME - Home (non-roaming) registration enable indicator.

If the mobile station is configured to receive mobile station terminated calls when not roaming, the mobile station shall set this field to '1'. Otherwise, the mobile station shall set this field to '0'. See 6.6.5.3.

MOB\_TERM\_FOR\_SID - Foreign SID roaming registration enable indicator.

If the mobile station is configured to receive mobile station terminated calls when it is a foreign SID roamer, the mobile station shall set this field to '1'. Otherwise, the mobile station shall set this field to '0'. See 6.6.5.3.

MOB\_TERM\_FOR\_NID - Foreign NID roaming registration enable indicator.

If the mobile station is configured to receive mobile station terminated calls when it is a foreign NID roamer, the mobile station shall set this field to '1'. Otherwise, the mobile station shall set this field to '0'. See 6.6.5.3.

1 The mobile station shall include one occurrence of the following two-field record for each  
2 home (non-roaming) (SID, NID) pair:

3                   SID    -   System identification.

4                               The mobile station shall set this field to the SID value for this  
5                               (SID, NID) pair.

6                   NID    -   Network identification.

7                               The mobile station shall set this field to the NID value for this  
8                               (SID, NID) pair.

9

10                  RESERVED   -   Reserved bits.

11                               The mobile station shall add reserved bits as needed in order  
12                               to make the length of the entire information record equal to an  
13                               integer number of octets. The mobile station shall set these  
14                               bits to '0'.

#### 6.7.4.9 Security Status

This information record can be included in a *Status Message* to return the authentication, encryption, and voice privacy modes of the mobile station. The mobile station shall use the following fixed-length format for the type-specific fields:

Type-Specific Field	Length (bits)
AUTH_MODE	2
ENCRYPT_MODE	2
PRIVATE_LCM	1
RESERVED	3

**AUTH\_MODE** - Authentication mode.

If the mobile station provided standard authentication information at the initiation of this call, the mobile station shall set this field to '01'. Otherwise, the mobile station shall set this field to '00'. All other values are reserved.

**ENCRYPT\_MODE** - Message encryption mode.

The mobile station shall set this field to the value shown in Table 7.7.2.3.2.8-2 corresponding to the message encryption mode currently in use for this call.

**PRIVATE\_LCM** - Private long code mask indicator.

If the mobile station is using the private long code mask for this call, the mobile station shall set this field to '1'. If the mobile station is using the public long code mask for this call, the mobile station shall set this field to '0'.

**RESERVED** - Reserved bits.

The mobile station shall set this field to '000'.

## 6.7.4.10 Connected Number

This information record identifies the responding party to a call. The mobile station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4
PI	2
SI	2

Zero or more occurrences of the following field:

CHAR	8
------	---

RESERVED	5
----------	---

NUMBER\_TYPE - Type of number.

The mobile station shall set this field to the NUMBER\_TYPE value shown in Table 6.7.1.3.2.4-2 corresponding to the type of the connected number as defined in ANSI T1.607 §4.5.9.

NUMBER\_PLAN - Numbering plan.

The mobile station shall set this field to the NUMBER\_PLAN value shown in Table 6.7.1.3.2.4-3 corresponding to the numbering plan used for the connected number, as defined in ANSI T1.607 §4.5.9.

PI - Presentation indicator.

This field indicates whether or not the connected number should be displayed. The mobile station shall set this field to the PI value shown in Table 6.7.4.4-1 corresponding to the presentation indicator as defined in ANSI T1.607 §4.5.9.

SI - Screening indicator.

This field indicates how the connected number was screened. The mobile station shall set this field to the SI value shown in Table 6.7.4.4-2 corresponding to the screening indicator value as defined in ANSI T1.607 §4.5.9.

CHAR - Character.

The mobile station shall include one occurrence of this field for each character in the connected number. The mobile station shall set each occurrence of this field to the ASCII representation corresponding to the character, as specified in ANSI X3.4, with the most significant bit set to '0'.

RESERVED - Reserved bits.

The mobile station shall set this field to '00000'.

2 This information record can be included in a *Status Message* to return the mobile station's  
3 IMSI. The mobile station shall use the following variable-length format for the type-specific  
4 fields:

7	IMSI_CLASS	-	If the mobile station has been assigned a class 0 IMSI, the mobile station shall set this field to '0'. Otherwise, the mobile station shall set this field to '1'.
8			
9			
10	IMSI_ADDR_NUM	-	Number of IMSI address digits.
11			If the mobile station has been assigned a class 1 IMSI, the mobile station shall set this field to four less than the number of digits in the NMSI. Otherwise, the mobile station shall set this field to '000'.
12			
13			
14			
15	MCC	-	Mobile country code.
16			The mobile station shall set this field to the MCC. See 6.3.1.
17	IMSI_11_12	-	The 11th and 12th digits of IMSI.
18			The mobile station shall set this field to IMSI_11_12. See 6.3.1.
19			
20	IMSI_S	-	Last ten digits of the IMSI.
21			The mobile station shall set this field to IMSI_S. See 6.3.1.
22	RESERVED	-	Reserved bit.
23			The mobile station shall set this field to '0'.
24			

## 1 6.7.4.12 ESN

2 This information record can be included in a *Status Response Message* to return the mobile  
3 station ESN. The mobile station shall use the following fixed-length format for the type-  
4 specific field:

5

Type-Specific Field	Length (bits)
ESN	32

6

7

ESN - Mobile station electronic serial number.

8

9

The mobile station shall set this field to its electronic serial number (see 6.3.2).

1

2

3 No text.

4

**1 7 REQUIREMENTS FOR BASE STATION CDMA OPERATION**

2 This section defines requirements that are specific to CDMA base station equipment and  
3 operation. See Section 3 and Section 5 for analog base station requirements.

**4 7.1 Transmitter****5 7.1.1 Frequency Parameters****6 7.1.1.1 Channel Spacing and Designation**

7 Channel spacing and designation for the base station transmissions shall be as specified in  
8 2.1.1.1. The base station shall support CDMA operations on CDMA channel numbers as  
9 shown in Table 6.1.1.1-1.

10 The CDMA frequency assignment in MHz corresponding to the CDMA Channel number  
11 shown in Table 6.1.1.1-1 (expressed as N) is calculated as shown in Table 6.1.1.1-2.

12 The Primary CDMA Channel shall be channel number 283 for System A and channel  
13 number 384 for System B.

14 The Secondary CDMA Channel shall be channel number 691 for System A and channel  
15 number 777 for System B.

**16 7.1.1.2 Frequency Tolerance**

17 The base station transmit carrier frequency shall be maintained within  $\pm 5 \times 10^{-8}$  of the  
18 CDMA frequency assignment.

**19 7.1.2 Power Output Characteristics**

20 Maximum effective radiated power (ERP) and antenna height above average terrain (HAAT)  
21 shall be coordinated locally on an ongoing basis.

**22 7.1.3 Modulation Characteristics****23 7.1.3.1 Forward CDMA Channel Signals**

24 The Forward CDMA Channel has the overall structure shown in Figure 7.1.3.1-1. The  
25 Forward CDMA Channel consists of the following code channels: the Pilot Channel, up to  
26 one Sync Channel, up to seven Paging Channels, and a number of Forward Traffic  
27 Channels. Each of these code channels is orthogonally spread by the appropriate Walsh  
28 function and is then spread by a quadrature pair of PN sequences at a fixed chip rate of  
29 1.2288 Mcps (million chips/sec). Multiple Forward CDMA Channels may be used within a  
30 base station in a frequency division multiplexed manner.



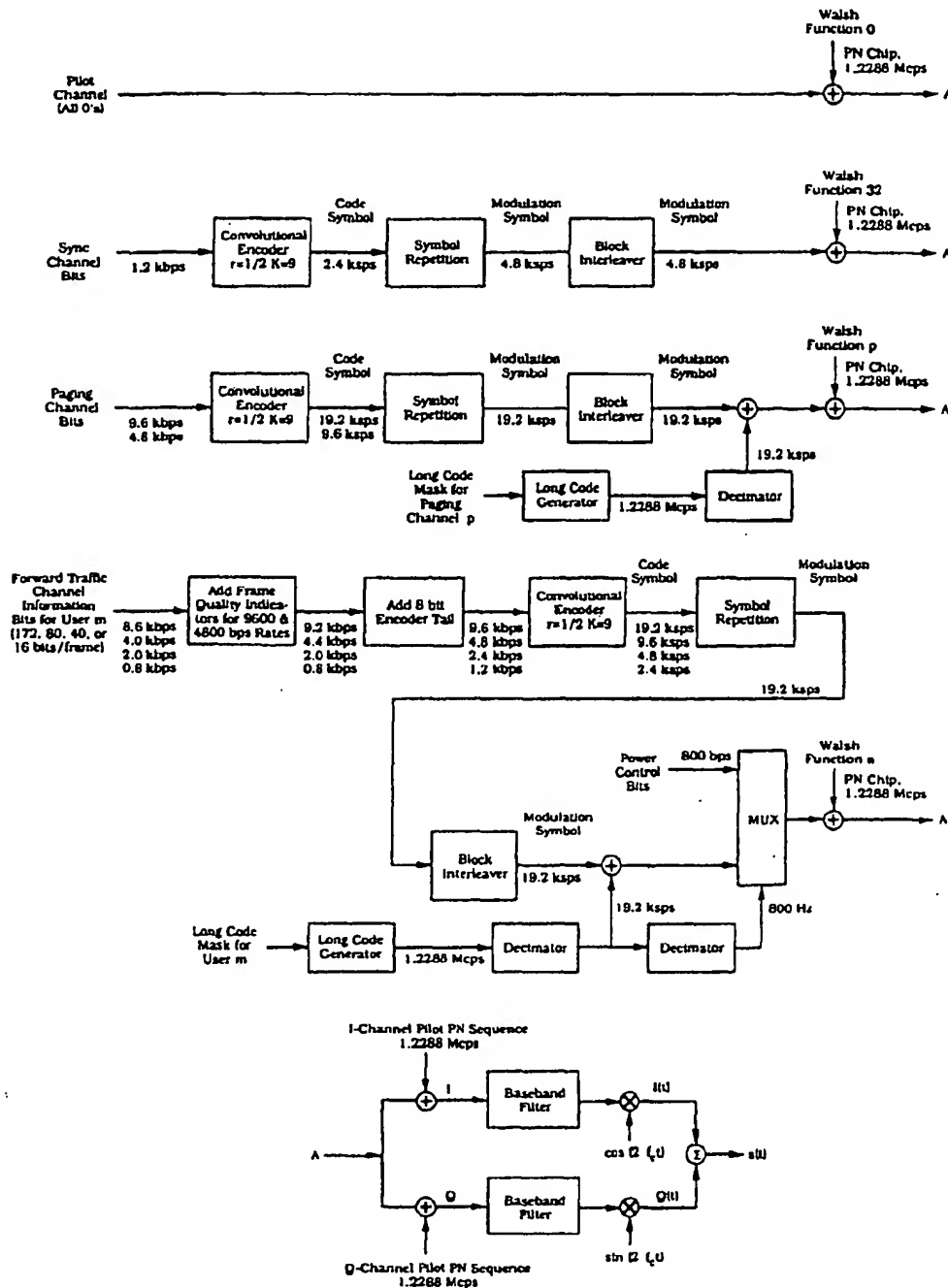


Figure 7.1.3.1-1. Forward CDMA Channel Structure

- 1 An example assignment of the code channels transmitted by a base station is shown in  
 2 Figure 7.1.3.1-2. Out of the 64 code channels available for use, the example depicts the  
 3 Pilot Channel (always required), one Sync Channel, seven Paging Channels (the maximum  
 4 number allowed), and 55 Traffic Channels. Another possible configuration could replace all  
 5 the Paging Channels and the Sync Channel one for one with Traffic Channels, for a  
 6 maximum of one Pilot Channel, zero Paging Channels, zero Sync Channels, and 63 Traffic  
 7 Channels.

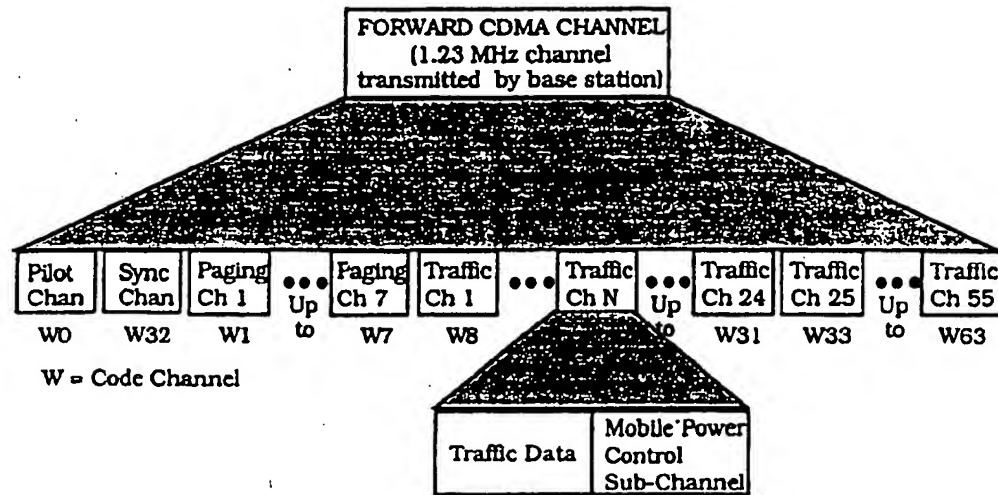


Figure 7.1.3.1-2. Example of a Forward CDMA Channel Transmitted by a Base Station

## 7.1.3.1.1 Modulation Parameters

The modulation parameters for the Forward CDMA Channel are as shown in Tables 7.1.3.1.1-1, 7.1.3.1.1-2, and 7.1.3.1.1-3.

Table 7.1.3.1.1-1. Sync Channel Modulation Parameters

Parameter	Data Rate (bps)		Units
	1200		
PN Chip Rate	1.2288		Mcps
Code Rate	1/2		bits/code symbol
Code Repetition	2		mod sym/code sym*
Modulation Symbol Rate	4,800		sps
PN Chips/Modulation Symbol	256		PN chips/mod sym
PN Chips/Bit	1024		PN chips/bit

\*Each repetition of a code symbol is a modulation symbol.

Table 7.1.3.1.1-2. Paging Channel Modulation Parameters

Parameter	Data Rate (bps)		Units
	9600	4800	
PN Chip Rate	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	bits/code symbol
Code Repetition	1	2	mod sym/code sym*
Modulation Symbol Rate	19,200	19,200	sps
PN Chips/Modulation Symbol	64	64	PN chips/mod sym
PN Chips/Bit	128	256	PN chips/bit

\*Each repetition of a code symbol is a modulation symbol.

Table 7.1.3.1.1-3. Forward Traffic Channel Modulation Parameters

Parameter	Data Rate (bps)				Units
	9600	4800	2400	1200	
PN Chip Rate	1.2288	1.2288	1.2288	1.2288	Mcps
Code Rate	1/2	1/2	1/2	1/2	bits/code symbol
Code Repetition	1	2	4	8	mod sym/code sym*
Modulation Symbol Rate	19,200	19,200	19,200	19,200	sps
PN Chips/Modulation Symbol	64	64	64	64	PN chips/mod sym
PN Chips/Bit	128	256	512	1024	PN chips/bit

\*Each repetition of a code symbol is a modulation symbol.

### 7.1.3.1.2 Data Rates

The Sync Channel shall operate at a fixed rate of 1200 bps. The Paging Channel shall support fixed data rate operation at 9600 or 4800 bps. The Forward Traffic Channel shall support variable data rate operation at 9600, 4800, 2400, and 1200 bps.

### 7.1.3.1.3 Convolutional Encoding

The Sync Channel, Paging Channel, and Forward Traffic Channel shall be convolutionally encoded prior to transmission. The convolutional code shall be rate 1/2, with a constraint length of 9. The generator functions of the code shall be  $g_0$  equals 753 (octal) and  $g_1$  equals 561 (octal). This is a rate 1/2 code generating two code symbols for each data bit input to the encoder. These code symbols shall be output so that the code symbol ( $c_0$ ) encoded with generator function  $g_0$  is output first, and the code symbol ( $c_1$ ) encoded with generator function  $g_1$  is output last. The state of the convolutional encoder, upon initialization, shall be the all-zero state. The first code symbol output after initialization shall be a code symbol encoded with generator function  $g_0$ .

Convolutional encoding involves the modulo-2 addition of selected taps of a serially time-delayed data sequence. The length of the data sequence delay is equal to  $K-1$ , where  $K$  is the constraint length of the code. Figure 7.1.3.1.3-1 illustrates the specific  $K$  equals 9, rate 1/2 convolutional encoder that is used for these channels.

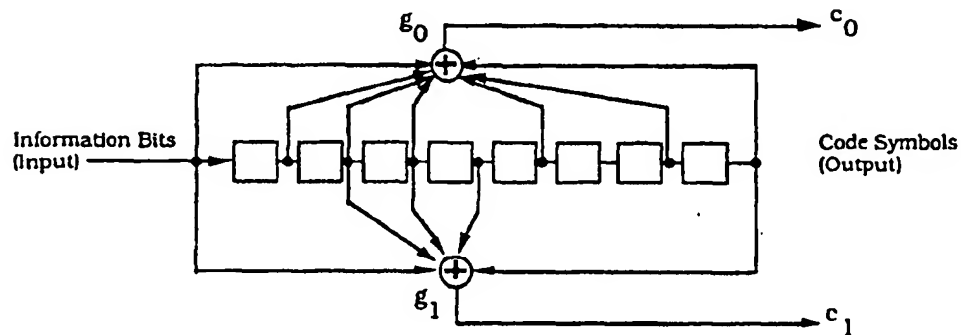


Figure 7.1.3.1.3-1.  $K = 9$ , Rate 1/2 Convolutional Encoder

### 7.1.3.1.4 Code Symbol Repetition

For the Sync Channel, each convolutionally encoded symbol shall be repeated 1 time (each symbol occurs 2 consecutive times) prior to block interleaving.

For the Paging and Forward Traffic Channels, each convolutionally encoded symbol shall be repeated prior to block interleaving whenever the information rate is lower than 9600 bps. Each code symbol at the 4800 bps rate shall be repeated 1 time (each symbol occurs 2 consecutive times). Each code symbol at the 2400 bps data rate shall be repeated 3 times (each symbol occurs 4 consecutive times). Each code symbol at the 1200 bps data rate

1 shall be repeated 7 times (each symbol occurs 8 consecutive times). For all the data rates  
 2 (9600, 4800, 2400, and 1200 bps) this results in a constant modulation symbol rate of  
 3 19200 modulation symbols per second.

#### 4 7.1.3.1.5 Block Interleaving

5 All symbols after repetition on the Sync Channel, Paging Channel, and Forward Traffic  
 6 Channel are block interleaved.

7 The Sync Channel shall use a block interleaver spanning 26.666... ms which is equivalent  
 8 to 128 modulation symbols at the symbol rate of 4800 sps.<sup>1</sup>

9 The input (array write) symbol sequence to the Sync Channel interleaver is given in Table  
 10 7.1.3.1.5-1. The table is read down by columns from the left to the right. That is, the first  
 11 input symbol (1) is at the top left, the second input symbol (1) is just below the first input  
 12 symbol, and the 17th input symbol (9) is just to the right of the first input symbol. The  
 13 output (array read) symbol sequence shall be as given in Table 7.1.3.1.5-2. The table is  
 14 read the same way as Table 7.1.3.1.5-1. That is, the first output symbol (1) is at the top  
 15 left, the second output symbol (33) is just below the first output symbol, and the 17th  
 16 output symbol (3) is just to the right of the first output symbol.

17 The Forward Traffic and Paging Channels shall use the identical block interleaver spanning  
 18 20 ms equivalent to 384 modulation symbols at the modulation symbol rate of 19200 sps.

19 The input (array write) and output (array read) symbol sequence for the four data rates  
 20 shall be as given in Tables 7.1.3.1.5-3 through 7.1.3.1.5-10. These tables are read down by  
 21 columns from the left to the right as with the Sync Channel interleaver. In these tables,  
 22 symbols with the same number denote repeated code symbols.

23

---

<sup>1</sup>The Sync Channel symbols are interleaved by a technique that is best described as a bit reversal method.

Table 7.1.3.1.5-1. Sync Channel Interleaver Input (Array Write Operation)

1	9	17	25	33	41	49	57
1	9	17	25	33	41	49	57
2	10	18	26	34	42	50	58
2	10	18	26	34	42	50	58
3	11	19	27	35	43	51	59
3	11	19	27	35	43	51	59
4	12	20	28	36	44	52	60
4	12	20	28	36	44	52	60
5	13	21	29	37	45	53	61
5	13	21	29	37	45	53	61
6	14	22	30	38	46	54	62
6	14	22	30	38	46	54	62
7	15	23	31	39	47	55	63
7	15	23	31	39	47	55	63
8	16	24	32	40	48	56	64
8	16	24	32	40	48	56	64

Table 7.1.3.1.5-2. Sync Channel Interleaver Output (Array Read Operation)

1	3	2	4	1	3	2	4
33	35	34	36	33	35	34	36
17	19	18	20	17	19	18	20
49	51	50	52	49	51	50	52
9	11	10	12	9	11	10	12
41	43	42	44	41	43	42	44
25	27	26	28	25	27	26	28
57	59	58	60	57	59	58	60
5	7	6	8	5	7	6	8
37	39	38	40	37	39	38	40
21	23	22	24	21	23	22	24
53	55	54	56	53	55	54	56
13	15	14	16	13	15	14	16
45	47	46	48	45	47	46	48
29	31	30	32	29	31	30	32
61	63	62	64	61	63	62	64

**Table 7.1.3.1.5-3. Forward Traffic and Paging Channel Interleaver Input**  
**(Array Write Operation at 9600 bps)**

1	25	49	73	97	121	145	169	193	217	241	265	289	313	337	361
2	26	50	74	98	122	146	170	194	218	242	266	290	314	338	362
3	27	51	75	99	123	147	171	195	219	243	267	291	315	339	363
4	28	52	76	100	124	148	172	196	220	244	268	292	316	340	364
5	29	53	77	101	125	149	173	197	221	245	269	293	317	341	365
6	30	54	78	102	126	150	174	198	222	246	270	294	318	342	366
7	31	55	79	103	127	151	175	199	223	247	271	295	319	343	367
8	32	56	80	104	128	152	176	200	224	248	272	296	320	344	368
9	33	57	81	105	129	153	177	201	225	249	273	297	321	345	369
10	34	58	82	106	130	154	178	202	226	250	274	298	322	346	370
11	35	59	83	107	131	155	179	203	227	251	275	299	323	347	371
12	36	60	84	108	132	156	180	204	228	252	276	300	324	348	372
13	37	61	85	109	133	157	181	205	229	253	277	301	325	349	373
14	38	62	86	110	134	158	182	206	230	254	278	302	326	350	374
15	39	63	87	111	135	159	183	207	231	255	279	303	327	351	375
16	40	64	88	112	136	160	184	208	232	256	280	304	328	352	376
17	41	65	89	113	137	161	185	209	233	257	281	305	329	353	377
18	42	66	90	114	138	162	186	210	234	258	282	306	330	354	378
19	43	67	91	115	139	163	187	211	235	259	283	307	331	355	379
20	44	68	92	116	140	164	188	212	236	260	284	308	332	356	380
21	45	69	93	117	141	165	189	213	237	261	285	309	333	357	381
22	46	70	94	118	142	166	190	214	238	262	286	310	334	358	382
23	47	71	95	119	143	167	191	215	239	263	287	311	335	359	383
24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384

**Table 7.1.3.1.5-4. Forward Traffic and Paging Channel Interleaver Output**  
**(Array Read Operation at 9600 bps)**

1	9	5	13	3	11	7	15	2	10	6	14	4	12	8	16
65	73	69	77	67	75	71	79	66	74	70	78	68	76	72	80
129	137	133	141	131	139	135	143	130	138	134	142	132	140	136	144
193	201	197	205	195	203	199	207	194	202	198	206	196	204	200	208
257	265	261	269	259	267	263	271	258	266	262	270	260	268	264	272
321	329	325	333	323	331	327	335	322	330	326	334	324	332	328	336
33	41	37	45	35	43	39	47	34	42	38	46	36	44	40	48
97	105	101	109	99	107	103	111	98	106	102	110	100	108	104	112
161	169	165	173	163	171	167	175	162	170	166	174	164	172	168	176
225	233	229	237	227	235	231	239	226	234	230	238	228	236	232	240
289	297	293	301	291	299	295	303	290	298	294	302	292	300	296	304
353	361	357	365	355	363	359	367	354	362	358	366	356	364	360	368
17	25	21	29	19	27	23	31	18	26	22	30	20	28	24	32
81	89	85	93	83	91	87	95	82	90	86	94	84	92	88	96
145	153	149	157	147	155	151	159	146	154	150	158	148	156	152	160
209	217	213	221	211	219	215	223	210	218	214	222	212	220	216	224
273	281	277	285	275	283	279	287	274	282	278	286	276	284	280	288
337	345	341	349	339	347	343	351	338	346	342	350	340	348	344	352
49	57	53	61	51	59	55	63	50	58	54	62	52	60	56	64
113	121	117	125	115	123	119	127	114	122	118	126	116	124	120	128
177	185	181	189	179	187	183	191	178	186	182	190	180	188	184	192
241	249	245	253	243	251	247	255	242	250	246	254	244	252	248	256
305	313	309	317	307	315	311	319	306	314	310	318	308	316	312	320
369	377	373	381	371	379	375	383	370	378	374	382	372	380	376	384

**Table 7.1.3.1.5-5. Forward Traffic and Paging Channel Interleaver Input  
(Array Write Operation at 4800 bps)**

1	13	25	37	49	61	73	85	97	109	121	133	145	157	169	181
1	13	25	37	49	61	73	85	97	109	121	133	145	157	169	181
2	14	26	38	50	62	74	86	98	110	122	134	146	158	170	182
2	14	26	38	50	62	74	86	98	110	122	134	146	158	170	182
3	15	27	39	51	63	75	87	99	111	123	135	147	159	171	183
3	15	27	39	51	63	75	87	99	111	123	135	147	159	171	183
4	16	28	40	52	64	76	88	100	112	124	136	148	160	172	184
4	16	28	40	52	64	76	88	100	112	124	136	148	160	172	184
5	17	29	41	53	65	77	89	101	113	125	137	149	161	173	185
5	17	29	41	53	65	77	89	101	113	125	137	149	161	173	185
6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186
6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186
7	19	31	43	55	67	79	91	103	115	127	139	151	163	175	187
7	19	31	43	55	67	79	91	103	115	127	139	151	163	175	187
8	20	32	44	56	68	80	92	104	116	128	140	152	164	176	188
8	20	32	44	56	68	80	92	104	116	128	140	152	164	176	188
9	21	33	45	57	69	81	93	105	117	129	141	153	165	177	189
9	21	33	45	57	69	81	93	105	117	129	141	153	165	177	189
10	22	34	46	58	70	82	94	106	118	130	142	154	166	178	190
10	22	34	46	58	70	82	94	106	118	130	142	154	166	178	190
11	23	35	47	59	71	83	95	107	119	131	143	155	167	179	191
11	23	35	47	59	71	83	95	107	119	131	143	155	167	179	191
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192

**Table 7.1.3.1.5-6. Forward Traffic and Paging Channel Interleaver Output  
(Array Read Operation at 4800 bps)**

1	5	3	7	2	6	4	8	1	5	3	7	2	6	4	8
33	37	35	39	34	38	36	40	33	37	35	39	34	38	36	40
65	69	67	71	66	70	68	72	65	69	67	71	66	70	68	72
97	101	99	103	98	102	100	104	97	101	99	103	98	102	100	104
129	133	131	135	130	134	132	136	129	133	131	135	130	134	132	136
161	165	163	167	162	166	164	168	161	165	163	167	162	166	164	168
17	21	19	23	18	22	20	24	17	21	19	23	18	22	20	24
49	53	51	55	50	54	52	56	49	53	51	55	50	54	52	56
81	85	83	87	82	86	84	88	81	85	83	87	82	86	84	88
113	117	115	119	114	118	116	120	113	117	115	119	114	118	116	120
145	149	147	151	146	150	148	152	145	149	147	151	146	150	148	152
177	181	179	183	178	182	180	184	177	181	179	183	178	182	180	184
9	13	11	15	10	14	12	16	9	13	11	15	10	14	12	16
41	45	43	47	42	46	44	48	41	45	43	47	42	46	44	48
73	77	75	79	74	78	76	80	73	77	75	79	74	78	76	80
105	109	107	111	106	110	108	112	105	109	107	111	106	110	108	112
137	141	139	143	138	142	140	144	137	141	139	143	138	142	140	144
169	173	171	175	170	174	172	176	169	173	171	175	170	174	172	176
25	29	27	31	26	30	28	32	25	29	27	31	26	30	28	32
57	61	59	63	58	62	60	64	57	61	59	63	58	62	60	64
89	93	91	95	90	94	92	96	89	93	91	95	90	94	92	96
121	125	123	127	122	126	124	128	121	125	123	127	122	126	124	128
153	157	155	159	154	158	156	160	153	157	155	159	154	158	156	160
185	189	187	191	186	190	188	192	185	189	187	191	186	190	188	192



**Table 7.1.3.1.5-7. Forward Traffic Channel Interleaver Input**  
**(Array Write Operation at 2400 bps)**

1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
1	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
4	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96

**Table 7.1.3.1.5-8. Forward Traffic Channel Interleaver Output**  
**(Array Read Operation at 2400 bps)**

1	3	2	4	1	3	2	4	1	3	2	4	1	3	2	4
17	19	18	20	17	19	18	20	17	19	18	20	17	19	18	20
33	35	34	36	33	35	34	36	33	35	34	36	33	35	34	36
49	51	50	52	49	51	50	52	49	51	50	52	49	51	50	52
65	67	66	68	65	67	66	68	65	67	66	68	65	67	66	68
81	83	82	84	81	83	82	84	81	83	82	84	81	83	82	84
9	11	10	12	9	11	10	12	9	11	10	12	9	11	10	12
25	27	26	28	25	27	26	28	25	27	26	28	25	27	26	28
41	43	42	44	41	43	42	44	41	43	42	44	41	43	42	44
57	59	58	60	57	59	58	60	57	59	58	60	57	59	58	60
73	75	74	76	73	75	74	76	73	75	74	76	73	75	74	76
89	91	90	92	89	91	90	92	89	91	90	92	89	91	90	92
5	7	6	8	5	7	6	8	5	7	6	8	5	7	6	8
21	23	22	24	21	23	22	24	21	23	22	24	21	23	22	24
37	39	38	40	37	39	38	40	37	39	38	40	37	39	38	40
53	55	54	56	53	55	54	56	53	55	54	56	53	55	54	56
69	71	70	72	69	71	70	72	69	71	70	72	69	71	70	72
85	87	86	88	85	87	86	88	85	87	86	88	85	87	86	88
13	15	14	16	13	15	14	16	13	15	14	16	13	15	14	16
29	31	30	32	29	31	30	32	29	31	30	32	29	31	30	32
45	47	46	48	45	47	46	48	45	47	46	48	45	47	46	48
61	63	62	64	61	63	62	64	61	63	62	64	61	63	62	64
77	79	78	80	77	79	78	80	77	79	78	80	77	79	78	80
93	95	94	96	93	95	94	96	93	95	94	96	93	95	94	96

**Table 7.1.3.1.5-9. Forward Traffic Channel Interleaver Input**  
(Array Write Operation at 1200 bps)

1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
1	4	7	10	13	16	19	22	25	28	31	34	37	40	43	46
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
2	5	8	11	14	17	20	23	26	29	32	35	38	41	44	47
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48

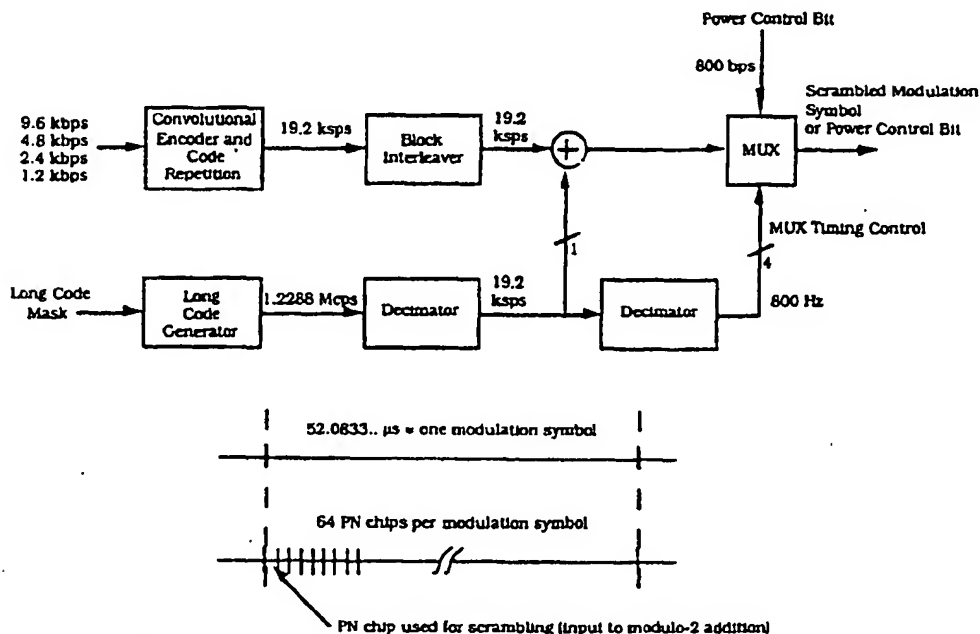
**Table 7.1.3.1.5-10. Forward Traffic Channel Interleaver Output**  
(Array Read Operation at 1200 bps)

1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
9	10	9	10	9	10	9	10	9	10	9	10	9	10	9	10
17	18	17	18	17	18	17	18	17	18	17	18	17	18	17	18
25	26	25	26	25	26	25	26	25	26	25	26	25	26	25	26
33	34	33	34	33	34	33	34	33	34	33	34	33	34	33	34
41	42	41	42	41	42	41	42	41	42	41	42	41	42	41	42
5	6	5	6	5	6	5	6	5	6	5	6	5	6	5	6
13	14	13	14	13	14	13	14	13	14	13	14	13	14	13	14
21	22	21	22	21	22	21	22	21	22	21	22	21	22	21	22
29	30	29	30	29	30	29	30	29	30	29	30	29	30	29	30
37	38	37	38	37	38	37	38	37	38	37	38	37	38	37	38
45	46	45	46	45	46	45	46	45	46	45	46	45	46	45	46
3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
11	12	11	12	11	12	11	12	11	12	11	12	11	12	11	12
19	20	19	20	19	20	19	20	19	20	19	20	19	20	19	20
27	28	27	28	27	28	27	28	27	28	27	28	27	28	27	28
35	36	35	36	35	36	35	36	35	36	35	36	35	36	35	36
43	44	43	44	43	44	43	44	43	44	43	44	43	44	43	44
7	8	7	8	7	8	7	8	7	8	7	8	7	8	7	8
15	16	15	16	15	16	15	16	15	16	15	16	15	16	15	16
23	24	23	24	23	24	23	24	23	24	23	24	23	24	23	24
31	32	31	32	31	32	31	32	31	32	31	32	31	32	31	32
39	40	39	40	39	40	39	40	39	40	39	40	39	40	39	40
47	48	47	48	47	48	47	48	47	48	47	48	47	48	47	48

### 7.1.3.1.6 Data Scrambling

Data scrambling applies to the Paging and Forward Traffic Channels. Data scrambling is performed on the modulation symbols output from the block interleaver at the 19,200 sps rate.

The data scrambling shall be accomplished by performing the modulo-2 addition of the interleaver output symbol with the binary value of the long code PN chip that is valid at the start of the transmission period for that symbol as shown in Figure 7.1.3.1.6-1. This PN sequence shall be the equivalent of the long code operating at 1.2288 MHz clock rate where only the first output of every 64 is used for the data scrambling (i.e., at a 19200 sps rate). The long code may be generated as described in 6.1.3.1.8. The long code masks to be used for the Paging and Forward Traffic Channels are specified in 7.1.3.4.6 and 7.1.3.5.6, respectively.



⊕ Modulo-2 addition

Figure 7.1.3.1.6-1. Data Scrambler Function and Timing

#### 7.1.3.1.7 Power Control Subchannel

A power control subchannel is continuously transmitted on the Forward Traffic Channel. The sub-channel shall transmit at a rate of one bit ('0' or '1') every 1.25 ms (i.e., 800 bps). A '0' bit shall indicate to the mobile station to increase the mean output power level and a '1' bit shall indicate to the mobile station to decrease the mean output power level. The amount that the mobile station increases and decreases its power for every power control bit is specified in 6.1.2.3.2.

The base station Reverse Traffic Channel receiver shall estimate the received signal strength of the particular mobile station it is assigned to over a 1.25 ms period, equivalent to 6 modulation symbols. The base station receiver shall use the estimate to determine the value of the power control bit ('0' or '1'). The base station shall transmit the power control bit on the corresponding Forward Traffic Channel using the puncturing technique described below. The transmission of the power control bit shall occur on the Forward Traffic Channel in the second power control group following the corresponding Reverse Traffic Channel power control group in which the signal strength was estimated.<sup>2</sup>

The length of one power control bit shall correspond exactly to two modulation symbols of the Forward Traffic Channel (i.e., 104.166...  $\mu$ s). Each power control bit shall replace two consecutive Forward Traffic Channel modulation symbols<sup>3</sup> and shall be transmitted with energy not less than  $E_b$ , namely the energy per information bit of the Forward Traffic Channel, as shown in Figure 7.1.3.1.7-1.

The power control bits shall be inserted into the Forward Traffic Channel data stream after the data scrambling.

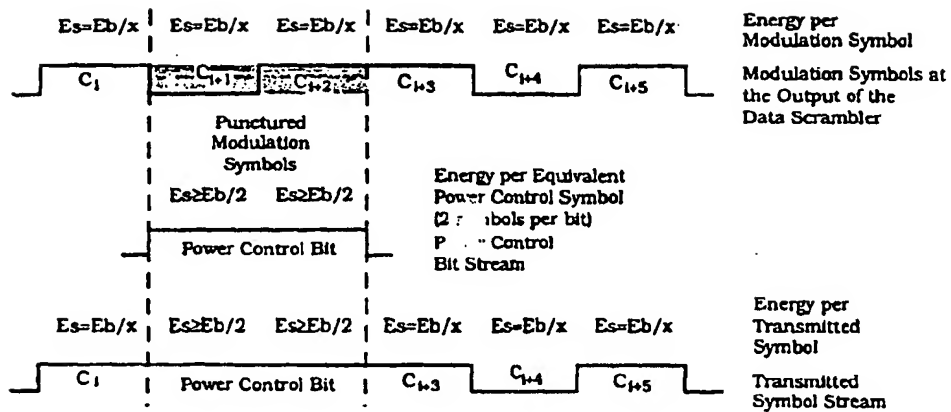
There are 16 possible starting positions for the power control bit as shown in Figure 7.1.3.1.7-2. Each position corresponds to one of the first 16 modulation symbols (numbered 0 through 15) of a 1.25 ms period. In each 1.25 ms period, a total of 24 bits from the long code are used for scrambling. These bits are numbered 0 through 23, where bit 0 is the first to be used and bit 23 the last in each 1.25 ms period.

The 4-bit binary number with values 0 through 15 formed by scrambling bits 23, 22, 21, and 20 shall be used to determine the position of the power control bit as shown in Figure 7.1.3.1.7-2. Bit 20 shall be the least significant bit, and bit 23 shall be the most significant bit. In the example of Figure 7.1.3.1.7-2, the values of bits 23, 22, 21, and 20 are '1011' (11 decimal), and the power control bit starting position is the eleventh. Figure 7.1.3.1.6-1 shows the relationship between the scrambled modulation symbols (at 19200 sps) and the punctured power control subchannel (at 800 bps).

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<sup>2</sup>For instance, as shown in Figure 7.1.3.1.7-2, the signal is received on the Reverse Traffic Channel in power control group number 5, and the corresponding power control bit is transmitted on the Forward Traffic Channel during power control group number  $5 + 2 = 7$ .

<sup>3</sup>This technique is commonly known as symbol puncturing. In this case, the punctured modulation symbols are replaced by the power control bits.



Where x is Given by:

Transmit Rate	Value of x
9600 bps	2
4800 bps	4
2400 bps	8
1200 bps	16

All unpunctured modulation symbols in a frame are transmitted at the same power level. Modulation symbols in adjacent frames may be sent at different power levels.

Figure 7.1.3.1.7-1. Power Control Sub-Channel Structure and Puncturing

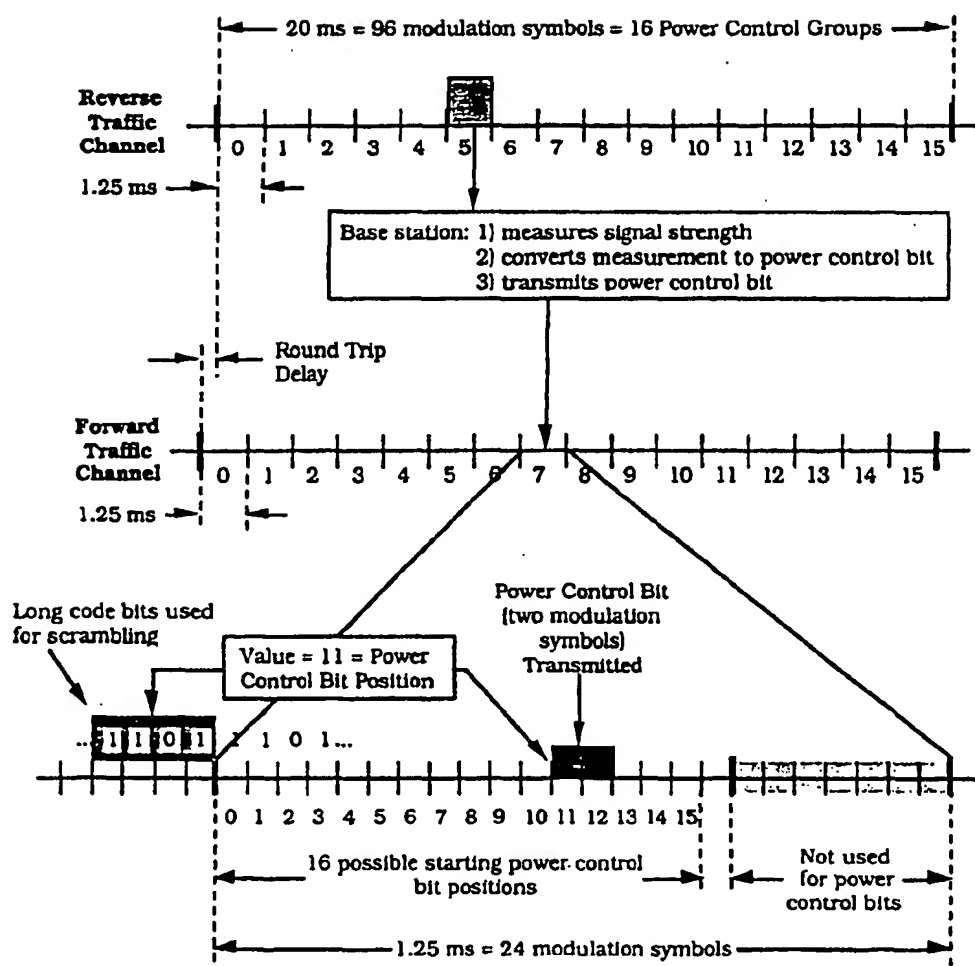


Figure 7.1.3.1.7-2. Randomization of Power Control Bit Positions

1    7.1.3.1.8 Orthogonal Spreading

2    Each code channel transmitted on the Forward CDMA Channel shall be spread with a  
3    Walsh function at a fixed chip rate of 1.2288 Mcps to provide orthogonal channelization  
4    among all code channels on a given Forward CDMA Channel. One of sixty-four time-  
5    orthogonal Walsh functions, as defined in Table 7.1.3.1.8-1, shall be used. A code channel  
6    that is spread using Walsh function  $n$  shall be assigned to code channel number  $n$  ( $n = 0$  to  
7    63). Walsh function time alignment shall be such that the first Walsh chip, designated by 0  
8    in the column headings of Table 7.1.3.1.8-1, begins at an even second time mark  
9    referenced to base station transmission time (see 7.1.5). The Walsh function spreading  
10    sequence shall repeat with a period of  $52.083... \mu s$  ( $= 64/1.2288$  Mcps) which is equal to  
11    the duration of one Forward Traffic Channel modulation symbol.

12    Code channel number zero shall always be assigned to the Pilot Channel. If the Sync  
13    Channel is present, it shall be assigned code channel number 32. If Paging Channels are  
14    present, they shall be assigned to code channel numbers one through seven (inclusive) in  
15    sequence. The remaining code channels are available for assignment to the Forward Traffic  
16    Channels.

### Walsh Chip within a Walsh Function

[illegible]



### 7.1.3.1.9 Quadrature Spreading

Following the orthogonal spreading, each code channel is spread in quadrature as shown in Figure 7.1.3.1-1. The spreading sequence shall be a quadrature sequence of length  $2^{15}$  (i.e., 32768 PN chips in length). This sequence is called the pilot PN sequence and shall be based on the following characteristic polynomials:

$$P_I(x) = x^{15} + x^{13} + x^9 + x^8 + x^7 + x^5 + 1$$

(for the in-phase (I) sequence)

and

$$P_Q(x) = x^{15} + x^{12} + x^{11} + x^{10} + x^6 + x^5 + x^4 + x^3 + 1$$

(for the quadrature (Q) phase sequence).

The maximum length linear feedback shift register sequence  $\{i(n)\}$  and  $\{q(n)\}$  based on the above polynomials are of length  $2^{15} - 1$  and can be generated by the following linear recursions:

$$i(n) = i(n-15) \oplus i(n-10) \oplus i(n-8) \oplus i(n-7) \oplus i(n-6) \oplus i(n-2)$$

(based on  $P_I(x)$  as the characteristic polynomial)

and

$$q(n) = q(n-15) \oplus q(n-12) \oplus q(n-11) \oplus q(n-10) \oplus q(n-9) \oplus q(n-5) \oplus q(n-4) \oplus q(n-3)$$

(based on  $P_Q(x)$  as the characteristic polynomial).

where  $i(n)$  and  $q(n)$  are binary-valued ('0' and '1') and the additions are modulo-2. In order to obtain the I and Q pilot PN sequences (of period  $2^{15}$ ), a '0' is inserted in  $\{i(n)\}$  and  $\{q(n)\}$  after 14 consecutive '0' outputs (this occurs only once in each period). Therefore, the pilot PN sequences have one run of 15 consecutive '0' outputs instead of 14.

The chip rate for the pilot PN sequence shall be 1.2288 Mcps. The pilot PN sequence period is  $32768/1228800 = 26.666...$  ms, and exactly 75 pilot PN sequence repetitions occur every 2 seconds. The pilot PN sequence offset shall be as specified in 7.1.3.2.1.

After baseband filtering, the binary ('0's and '1's) I and Q at the output of the quadrature spreading (shown in Figure 7.1.3.1-1) shall be mapped into phase according to Table 7.1.3.1.9-1.

Table 7.1.3.1.9-1. Forward CDMA Channel I and Q Mapping

I	Q	Phase
0	0	$\pi/4$
1	0	$3\pi/4$
1	1	$-3\pi/4$
0	1	$-\pi/4$

The resulting signal constellation and phase transitions are shown in Figure 7.1.3.1.9-1.

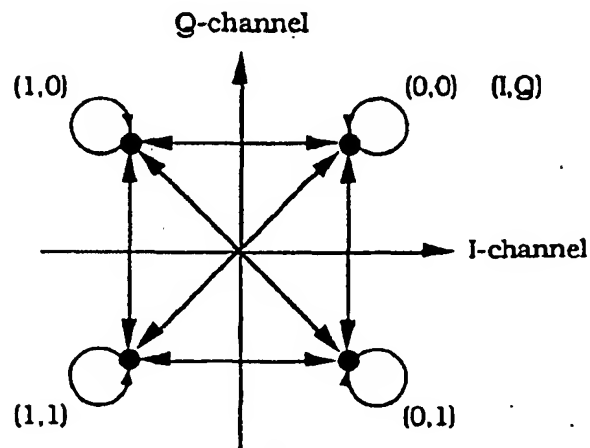


Figure 7.1.3.1.9-1. Forward CDMA Channel Signal Constellation and Phase Transition

### 7.1.3.1.10 Filtering

#### 7.1.3.1.10.1 Baseband Filtering

Following the spreading operation, the I and Q impulses are applied to the inputs of the I and Q baseband filters as shown in Figure 7.1.3.1-1. The baseband filters shall have a frequency response  $S(f)$  that satisfies the limits given in Figure 7.1.3.1.10.1-1. Specifically, the normalized frequency response of the filter shall be contained within  $\pm\delta_1$  in the passband  $0 \leq f \leq f_p$  and shall be less than or equal to  $-\delta_2$  in the stopband  $f \geq f_s$ . The numerical values for the parameters are  $\delta_1 = 1.5$  dB,  $\delta_2 = 40$  dB,  $f_p = 590$  kHz, and  $f_s = 740$  kHz.

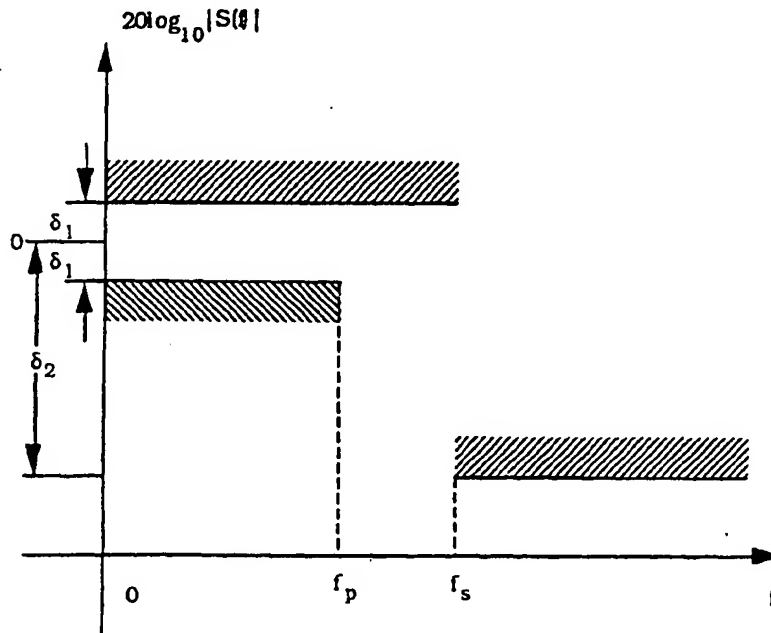


Figure 7.1.3.1.10.1-1. Baseband Filters Frequency Response Limits

Let  $s(t)$  be the impulse response of the baseband filter. Then  $s(t)$  shall satisfy the following equation:

$$\text{Mean Squared Error} = \sum_{k=0}^{\infty} [\alpha s(kT_s - \tau) - h(k)]^2 \leq 0.03,$$

where the constants  $\alpha$  and  $\tau$  are used to minimize the mean squared error. The constant  $T_s$  is equal to 203.451... ns, which equals one quarter of a PN chip. The values of the coefficients  $h(k)$ , for  $k < 48$ , are given in Table 7.1.3.1.10.1-1;  $h(k) = 0$  for  $k \geq 48$ . Note that  $h(k)$  equals  $h(47 - k)$ .

Table 7.1.3.1.10.1-1. Coefficients  $h(k)$ 

$k$	$h(k)$
0, 47	-0.025288315
1, 46	-0.034167931
2, 45	-0.035752323
3, 44	-0.016733702
4, 43	0.021602514
5, 42	0.064938487
6, 41	0.091002137
7, 40	0.081894974
8, 39	0.037071157
9, 38	-0.021998074
10, 37	-0.060716277
11, 36	-0.051178658
12, 35	0.007874526
13, 34	0.084368728
14, 33	0.126869306
15, 32	0.094528345
16, 31	-0.012839661
17, 30	-0.143477028
18, 29	-0.211829088
19, 28	-0.140513128
20, 27	0.094601918
21, 26	0.441387140
22, 25	0.785875640
23, 24	1.0

### 7.1.3.1.10.2 Phase Characteristics

The base station shall provide phase equalization for the transmit signal path.<sup>4</sup> The equalizing filter shall be designed to provide the equivalent baseband transfer function

$$H(\omega) = K \frac{\omega^2 + j\alpha\omega\omega_0 - \omega_0^2}{\omega^2 - j\alpha\omega\omega_0 - \omega_0^2}$$

where K is an arbitrary gain, j equals  $\sqrt{-1}$ ,  $\alpha$  equals 1.36, and  $\omega_0$  equals  $2\pi \times 3.15 \times 10^5$ . The equalizing filter implementation shall be equivalent to applying baseband filters with this transfer function individually to the baseband I and Q waveforms.

The overall base station transmitter filter response (including the equalizing filter) shall be such that, for a cascaded filter consisting of the overall base station filter and a filter with a transfer function that is the inverse of the equalization filter specified above, the mean squared phase error from the best fit linear phase response, integrated over the frequency range  $1 \text{ kHz} \leq |f - f_c| \leq 630 \text{ kHz}$ , should be no greater than 0.01 squared radians. For purposes of this requirement, "overall" shall mean from the I and Q baseband filter inputs (see 7.1.3.1.10.1) to the RF output of the transmitter.

### 7.1.3.2 Pilot Channel

A Pilot Channel is transmitted at all times by the base station on each active Forward CDMA Channel. The Pilot Channel is an unmodulated spread spectrum signal that is used for synchronization by a mobile station operating within the coverage area of the base station.

#### 7.1.3.2.1 Pilot PN Sequence Offset

Each base station shall use a time offset of the pilot PN sequence to identify a Forward CDMA Channel. Time offsets may be reused within a CDMA cellular system.

Distinct Pilot Channels shall be identified by an offset index (0 through 511 inclusive). This offset index specifies the offset value from the zero offset pilot PN sequence. The zero offset pilot PN sequence shall be such that the start of the sequence shall be output at the beginning of every even second in time, referenced to base station transmission time (see 7.1.5). The start of the zero offset pilot PN sequence for either the I or Q sequence shall be defined as the state of the sequence for which the previous 15 outputs were '0' (see Figure 1.2-1).

Five hundred twelve unique values are possible for the pilot PN sequence offset. The offset (in chips) for a given pilot PN sequence from the zero shift pilot PN sequence equals the index value multiplied by 64. For example, if the pilot PN sequence offset index is 15, the pilot PN sequence offset will be  $15 \times 64 = 960$  PN chips. In this case the pilot PN sequence will start 781.25  $\mu\text{s}$  after the start of every even second of time, referenced to base station transmission time. The pilot PN sequence offset is illustrated in Figure 7.1.3.2.1-1. The same pilot PN sequence offset shall be used on all CDMA frequency assignments for a given base station.

<sup>4</sup> This equalization simplifies the design of the mobile station receive filters.

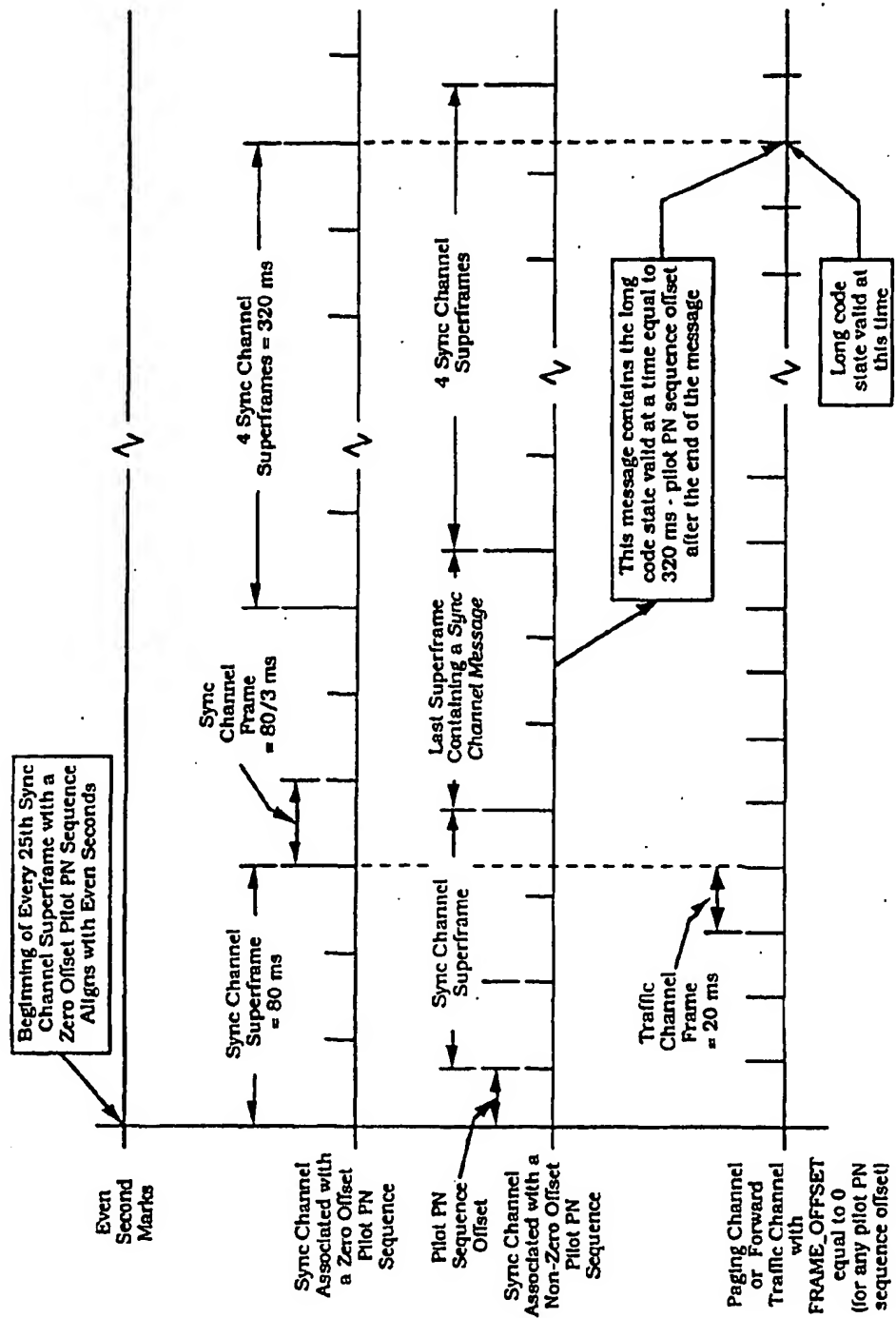


Figure 7.1.3.2.1-1. Forward CDMA Channel Pilot PN Sequence Offset

1 7.1.3.2.2 Pilot Channel Orthogonal Spreading

2 Prior to transmission, the pilot channel shall be spread with Walsh function zero as  
3 specified in 7.1.3.1.8.

4 7.1.3.2.3 Pilot Channel Quadrature Spreading

5 The Pilot Channel shall be PN spread as specified in 7.1.3.1.9.

6 7.1.3.2.4 Pilot Channel Filtering

7 Filtering for the Pilot Channel shall be as specified in 7.1.3.1.10.

8 7.1.3.3 Sync Channel

9 The Sync Channel is an encoded, interleaved, spread, and modulated spread spectrum  
10 signal that is used by mobile stations operating within the coverage area of the base station  
11 to acquire initial time synchronization.

12 7.1.3.3.1 Sync Channel Time Alignment and Modulation Rates

13 The bit rate for the Sync Channel is 1200 bps. A Sync Channel frame is 26.666... ms in  
14 duration. The I and Q channel pilot PN sequences for the Sync Channel use the same pilot  
15 PN sequence offset as the Pilot Channel for a given base station.

16 Once the mobile station achieves pilot PN sequence synchronization by acquiring the Pilot  
17 Channel, the synchronization for the Sync Channel is immediately known. This is because  
18 the Sync Channel (and all other channels) are spread with the same pilot PN sequence, and  
19 because the frame and interleaver timing on the Sync Channel are aligned with the pilot PN  
20 sequence.

21 The start of the interleaver block and frame of the Sync Channel shall align with the start of  
22 the pilot PN sequence being used to spread the Forward CDMA Channel (see  
23 Figure 7.1.3.2.1-1). See Table 7.1.3.1.1-1 for a summary of Sync Channel modulation  
24 parameters.

25 7.1.3.3.2 Sync Channel Structure

26 A Sync Channel superframe is formed by three Sync Channel frames (i.e., 80 ms) as shown  
27 in Figure 7.1.3.2.1-1. Messages transmitted on the Sync Channel begin only at the start of  
28 a Sync Channel superframe (see Figure 7.7.1.1-1).

29 When using the zero-offset Pilot PN sequence, Sync Channel superframes begin at the even-  
30 second time mark referenced to base station transmission time (see 7.1.5) or at the start of  
31 any third Sync Channel frame after that. When using a Pilot PN sequence other than the  
32 zero-offset sequence, the Sync Channel superframe shall begin at the even second time  
33 mark plus the pilot PN offset value in time.

1 7.1.3.3.3 Sync Channel Convolutional Encoding

2 The Sync Channel data shall be convolutionally encoded prior to transmission as specified  
3 in 7.1.3.1.3. The state of the Sync Channel convolutional encoder shall not be reset  
4 between Sync Channel frames.

5 7.1.3.3.4 Sync Channel Code Symbol Repetition

6 The Sync Channel code symbols shall be repeated as specified in 7.1.3.1.4.

7 7.1.3.3.5 Sync Channel Interleaving

8 The modulation symbols on the Sync Channel shall be interleaved as specified in 7.1.3.1.5  
9 with the following exception: since the Sync Channel is not convolutionally encoded by  
10 blocks (the state of the encoder is not reset after initialization), the last eight bits of a Sync  
11 Channel frame influence symbols in the successive interleaver block.

12 The interleaver block shall align with the Sync Channel frame, such that the first bit of the  
13 frame influences the first 36 (numbered 1 1 2 2 . . . 18 18) modulation symbols input into  
14 the interleaver block.

15 7.1.3.3.6 Sync Channel Data Scrambling

16 The Sync Channel data shall not be scrambled.

17 7.1.3.3.7 Sync Channel Power Control Subchannel

18 The base station shall not insert a power control subchannel on the Sync Channel.

19 7.1.3.3.8 Sync Channel Orthogonal Spreading

20 Prior to transmission, the Sync Channel shall be spread with Walsh function 32 as  
21 specified in 7.1.3.1.8.

22 7.1.3.3.9 Sync Channel Quadrature Spreading

23 The Sync Channel shall be PN spread as specified in 7.1.3.1.9.

24 7.1.3.3.10 Sync Channel Filtering

25 Filtering for the Sync Channel shall be as specified in 7.1.3.1.10.

26 7.1.3.4 Paging Channel

27 The Paging Channel is an encoded, interleaved, spread, and modulated spread spectrum  
28 signal that is used by mobile stations operating within the coverage area of the base  
29 station. The base station uses Paging Channel to transmit system overhead information  
30 and mobile station specific messages.

31 The Primary Paging Channel shall be Paging Channel number 1.



1    7.1.3.4.1 Paging Channel Time Alignment and Modulation Rates

2    The Paging Channel shall transmit information at a fixed data rate of 9600 or 4800 bps.  
3    All Paging Channels in a given system (i.e., with the same SID) should transmit information  
4    at the same data rate. The Paging Channel frame is 20 ms in duration.

5    The I and Q channel pilot PN sequences for the Paging Channel use the same pilot PN  
6    sequence offset as the Pilot Channel for a given base station.

7    The start of the interleaver block and frame of the Paging Channel shall align with the start  
8    of the zero-offset pilot PN sequence at every even second time mark (see Figure 7.1.3.2.1-1).

9    The first Paging Channel frame shall occur at the start of base station transmission time  
10    (see 7.1.5). See Table 7.1.3.1.1-2 for a summary of Paging Channel modulation  
11    parameters.

12    7.1.3.4.2 Paging Channel Structure

13    The Paging Channel shall be divided into Paging Channel slots that are each 80 ms in  
14    duration as shown in the examples in Figure 6.6.2.1.1.1-1 and Figure 7.7.2.1.1-1.

15    7.1.3.4.3 Paging Channel Convolutional Encoding

16    The Paging Channel data shall be convolutionally encoded prior to transmission as  
17    specified in 7.1.3.1.3. The state of the Paging Channel convolutional encoder shall not be  
18    reset between Paging Channel frames.

19    7.1.3.4.4 Paging Channel Code Symbol Repetition

20    The Paging Channel code symbols shall be repeated as specified in 7.1.3.1.4.

21    7.1.3.4.5 Paging Channel Interleaving

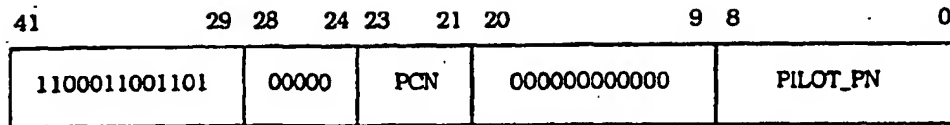
22    The modulation symbols on the Paging Channel shall be interleaved as specified in  
23    7.1.3.1.5. The interleaver block shall align with the Paging Channel frame. The alignment  
24    shall be such that the first bit of the frame influences the first 18 (for 9600 bps) or 36 (for  
25    4800 bps) modulation symbols input into the interleaver.

26    Since the Paging Channel is not convolutionally encoded by blocks, the last 8 bits of a  
27    Paging Channel frame influence symbols in the successive interleaver block.

28    7.1.3.4.6 Paging Channel Data Scrambling

29    The Paging Channel data shall be scrambled as specified in 7.1.3.1.6 utilizing the Paging  
30    Channel long code mask as shown in Figure 7.1.3.4.6-1.

31



PCN - Paging Channel Number

PILOT\_PN - Pilot PN sequence offset index for the Forward CDMA Channel

**Figure 7.1.3.4.6-1. Paging Channel Long Code Mask**

#### 7.1.3.4.7 Paging Channel Power Control Subchannel

The base station shall not insert a power control subchannel on the Paging Channel.

#### 7.1.3.4.8 Paging Channel Orthogonal Spreading

Prior to transmission, the Paging Channel shall be spread by a Walsh function, with index equal to the Paging Channel number, as specified in 7.1.3.1.8.

#### 7.1.3.4.9 Paging Channel Quadrature Spreading

The Paging Channel shall be PN spread as specified in 7.1.3.1.9.

#### 7.1.3.4.10 Paging Channel Filtering

Filtering for the Paging Channel shall be as specified in 7.1.3.1.10.

#### 7.1.3.5 Forward Traffic Channel

The Forward Traffic Channel is used for the transmission of user and signaling information to a specific mobile station during a call. The maximum number of Forward Traffic Channels that can be simultaneously supported by a given Forward CDMA Channel is equal to 63 minus the number of Paging Channels and Sync Channels operating on the same Forward CDMA Channel.

##### 7.1.3.5.1 Forward Traffic Channel Time Alignment and Modulation Rates

The base station shall transmit information on the Forward Traffic Channel at variable data rates of 9600, 4800, 2400, and 1200 bps. The Forward Traffic Channel frame shall be 20 ms in duration. The data rate shall be selected on a frame-by-frame (i.e., 20 ms) basis. Although the data rate may vary on a frame-by-frame basis, the modulation symbol rate is kept constant by code repetition at 19,200 symbols per second (sps).

The I and Q channel pilot PN sequences for the Forward Traffic Channel use the same pilot PN sequence offset as the Pilot Channel for a given base station.

The modulation symbols that are transmitted at the lower data rates shall be transmitted using lower energy. Specifically, the energy per modulation symbol ( $E_s$ ) for the supported data rates should be as in Table 7.1.3.5.1-1 where  $E_b$  is the energy per information bit.

Note that all symbols in an interleaver block are from the same frame. Thus they are all

transmitted at the same energy. The transmit power of the power control bits shall be as specified in 7.1.3.1.7.

**Table 7.1.3.5.1-1. Transmitted Symbol Energy Versus Data Rate**

Data Rate (bps)	Energy per Modulation Symbol
9600	$E_s = E_b/2$
4800	$E_s = E_b/4$
2400	$E_s = E_b/8$
1200	$E_s = E_b/16$

A base station may implement staggered Forward Traffic Channel frames. The time offset is specified by the FRAME\_OFFSET parameter.<sup>5</sup> A zero-offset Forward Traffic Channel frame shall be such that every 100th frame shall align with the even-second time mark referenced to base station transmission time (see 7.1.5). A staggered frame shall begin  $1.25 \times \text{FRAME\_OFFSET}$  ms later than the zero-offset Traffic Channel frame. The Forward Traffic Channel block interleaver shall always be aligned with the Forward Traffic Channel frame.

#### 7.1.3.5.2 Forward Traffic Channel Frame Structure

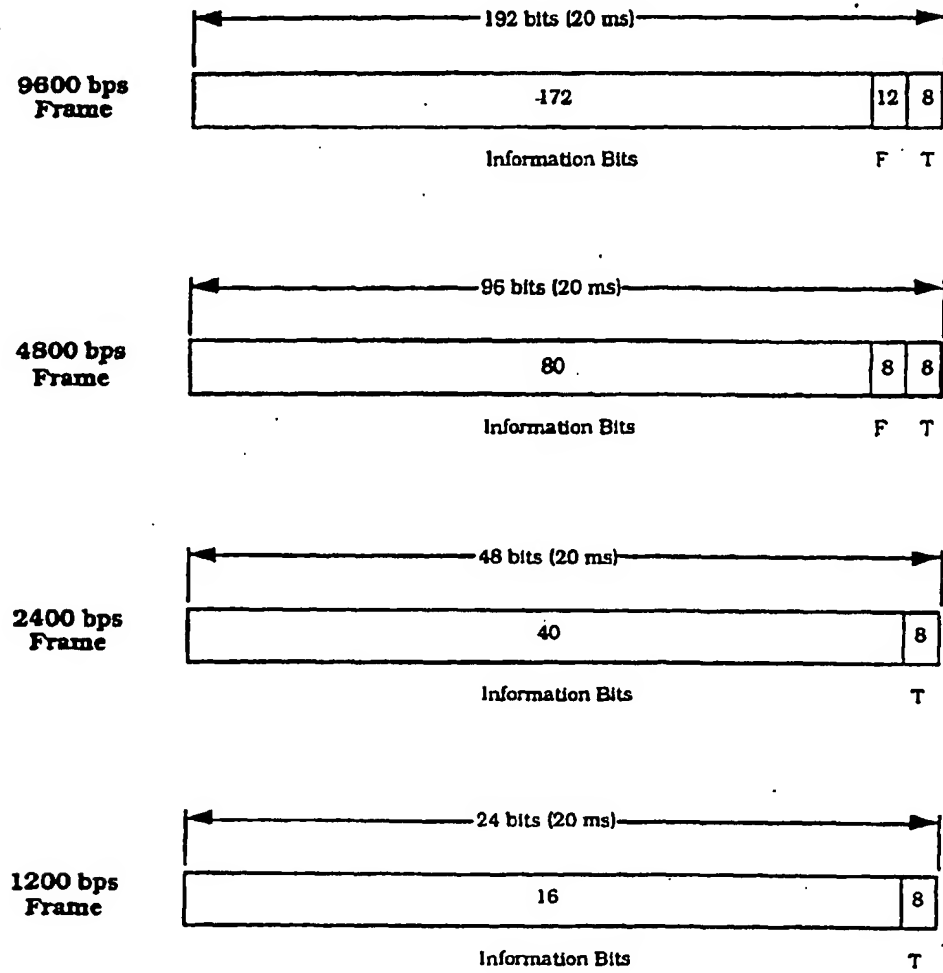
Forward Traffic Channel frames sent at the 9600 bps transmission rate shall consist of 192 bits. These 192 bits shall be composed of 172 information bits followed by 12 frame quality indicator (CRC) bits and eight Encoder Tail Bits as shown in Figure 7.1.3.5.2-1.

Forward Traffic Channel frames sent at the 4800 bps transmission rate shall consist of 96 bits. These 96 bits shall be composed of 80 information bits followed by eight frame quality indicator (CRC) bits and eight Encoder Tail Bits as shown in Figure 7.1.3.5.2-1.

Forward Traffic Channel frames sent at the 2400 bps transmission rate shall consist of 48 bits. These 48 bits shall be composed of 40 information bits followed by eight Encoder Tail Bits as shown in Figure 7.1.3.5.2-1.

Forward Traffic Channel frames sent at the 1200 bps transmission rate shall consist of 24 bits. These 24 bits shall be composed of 16 information bits followed by eight Encoder Tail Bits as shown in Figure 7.1.3.5.2-1.

<sup>5</sup>The Forward Traffic Channel time offset is the same as the Reverse Traffic Channel time offset.

**Notation**

F - Frame Quality Indicator (CRC)  
T - Encoder Tail Bits

Figure 7.1.3.5.2-1. Forward Traffic Channel Frame Structure

#### 7.1.3.5.2.1 Forward Traffic Channel Frame Quality Indicator

Each 9600 bps and 4800 bps frame shall include a frame quality indicator. This frame quality indicator is a CRC.<sup>6</sup> No frame quality indicator is used for the 2400 bps and 1200 bps transmission rates.

For both the 9600 bps and 4800 bps rates, the frame quality indicator (CRC) shall be calculated on all bits within the frame, except the frame quality indicator itself and the Encoder Tail Bits. The 9600 bps transmission rate shall use a 12-bit frame quality indicator. The generator polynomial for this frame quality indicator shall be as follows:

$$g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1.$$

The 4800 bps transmission rate shall use an 8-bit frame quality indicator. The generator polynomial for this frame quality indicator shall be as follows:

$$g(x) = x^8 + x^7 + x^4 + x^3 + x + 1.$$

The frame quality indicators shall be computed according to the following procedure using the logic shown in Figures 7.1.3.5.2.1-1 and 7.1.3.5.2.1-2:

- Initially, all shift register elements shall be set to logical one and the switches shall be set in the up position.
- The register shall be clocked 172 times (for 192-bit frame) or 80 times (for 96-bit frame) with the information bits as input.
- The switches shall be set in the down position, and the register shall be clocked an additional 12 times (for 192-bit frame) or 8 times (for 96-bit frame). The 12 or 8 additional output bits shall be the frame quality indicator bits.
- The bits shall be transmitted in the order calculated.

---

<sup>6</sup>The frame quality indicator supports two functions at the receiver. The first function is to determine whether the frame is in error. The second function is to assist in the determination of the data rate of the received frame. Other parameters may be needed for rate determination in addition to the frame quality indicator, such as symbol error rate evaluated at the four data rates.

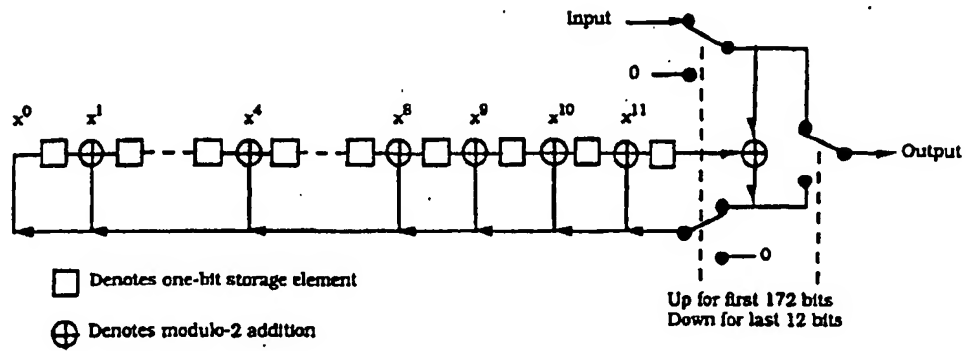


Figure 7.1.3.5.2.1-1. Forward Traffic Channel Frame Quality Indicator Calculation at the 9600 bps Rate

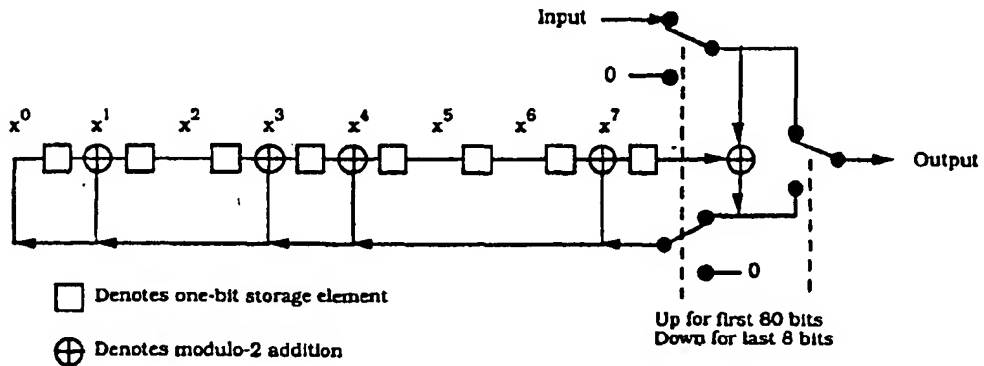


Figure 7.1.3.5.2.1-2. Forward Traffic Channel Frame Quality Indicator Calculation at the 4800 bps Rate

1 7.1.3.5.2.2 Forward Traffic Channel Encoder Tail Bits

2 The last eight bits of each Forward Traffic Channel frame are called the Encoder Tail Bits.  
3 These eight bits shall be set to '0'.

4 7.1.3.5.2.3 Reserved

5 7.1.3.5.2.4 Null Traffic Channel Data

6 Null Traffic Channel data shall consist of frames of 16 ones followed by 8 zeros (the  
7 Encoder Tail Bits) sent at the 1200 bps rate.

8 The base station transmits null Traffic Channel data when no service option is active. Null  
9 Traffic Channel data serves as a "keep-alive" operation so that the mobile station can  
10 maintain connectivity with the base station.

11 7.1.3.5.3 Forward Traffic Channel Convolutional Encoding

12 The Forward Traffic Channel data shall be convolutionally encoded prior to transmission as  
13 specified in 7.1.3.1.3.

14 When generating Forward Traffic Channel data, the encoder shall be initialized to the all  
15 zero state at the end of each 20 ms frame.

16 7.1.3.5.4 Forward Traffic Channel Code Symbol Repetition

17 The Forward Traffic Channel code symbols shall be repeated as specified in 7.1.3.1.4.

18 7.1.3.5.5 Forward Traffic Channel Interleaving

19 The modulation symbols on the Forward Traffic Channel shall be interleaved as specified in  
20 7.1.3.1.5. The interleaver block shall align with the Traffic Channel frame. The alignment  
21 shall be such that the first bit of the frame influences the first 18 (for 9600 bps), 36 (for  
22 4800 bps), 72 (for 2400 bps) or 144 (for 1200 bps) modulation symbols input into the  
23 interleaver.<sup>7</sup>

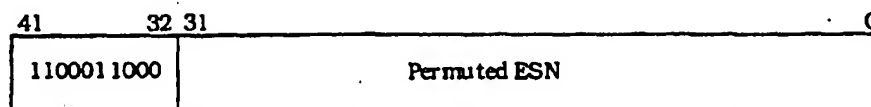
24 7.1.3.5.6 Forward Traffic Channel Data Scrambling

25 The Forward Traffic Channel data shall be scrambled as specified in 7.1.3.1.6. The public  
26 long code mask shall be as shown in Figure 7.1.3.5.6-1. The permutation of the ESN bits  
27 in the public long code mask shall be as specified in 6.1.3.1.8. The generation of the  
28 private long code mask shall be as specified in Appendix A.

29

---

<sup>7</sup>Since the Forward Traffic Channel is convolutionally encoded by blocks (the state of the encoder is reset at the end of each frame), all bits of one Forward Traffic Channel frame influence symbols in only one interleaver block.



**Figure 7.1.3.5.8-1. Forward Traffic Channel Public Long Code Mask**

#### 7.1.3.5.7 Forward Traffic Channel Power Control Subchannel

The base station shall insert on every Forward Traffic Channel a power control subchannel as specified in 7.1.3.1.7.

#### 7.1.3.5.8 Forward Traffic Channel Orthogonal Spreading

Prior to transmission, the Forward Traffic Channel shall be spread with a Walsh function as specified in 7.1.3.1.8.

#### 7.1.3.5.9 Forward Traffic Channel Quadrature Spreading

The Forward Traffic Channel shall be PN spread as specified in 7.1.3.1.9.

#### 7.1.3.5.10 Forward Traffic Channel Filtering

Filtering for the Forward Traffic Channel shall be as specified in 7.1.3.1.10.

#### 7.1.3.5.11 Multiplex Option Information

Multiplex Option 1 is also referred to as the default multiplex option.<sup>8</sup> It provides for the transmission of primary traffic and signaling or secondary traffic. Signaling traffic may be transmitted via blank-and-burst with the signaling traffic using all of the frame or via dim-and-burst with the primary traffic and signaling traffic sharing the frame. Multiplex Option 1 also supports the transmission of secondary traffic. When primary traffic is active, secondary traffic is transmitted via dim-and-burst with the primary traffic and secondary traffic sharing the frame. When primary traffic is not active, secondary traffic is transmitted via blank-and-burst with the secondary traffic using all of the frame. The information bit structures for primary and signaling traffic are specified in 7.1.3.5.11.1. The information bit structures for secondary traffic are specified in 7.1.3.5.11.2. Table 7.1.3.5.11-1 shows the information bit structures supported by Multiplex Option 1.

The base station shall support Multiplex Option 1. The base station shall support the transmission of primary traffic and signaling traffic using the information bit structures specified in 7.1.3.5.11.1. The base station may support secondary traffic, and if so, the base station shall also use the information bit structures specified in 7.1.3.5.11.2. Procedures for support of secondary traffic data are for further study.

Other multiplex options are for further study.

<sup>8</sup>The multiplex option is the same on both the Forward Traffic Channel and the Reverse Traffic Channel.

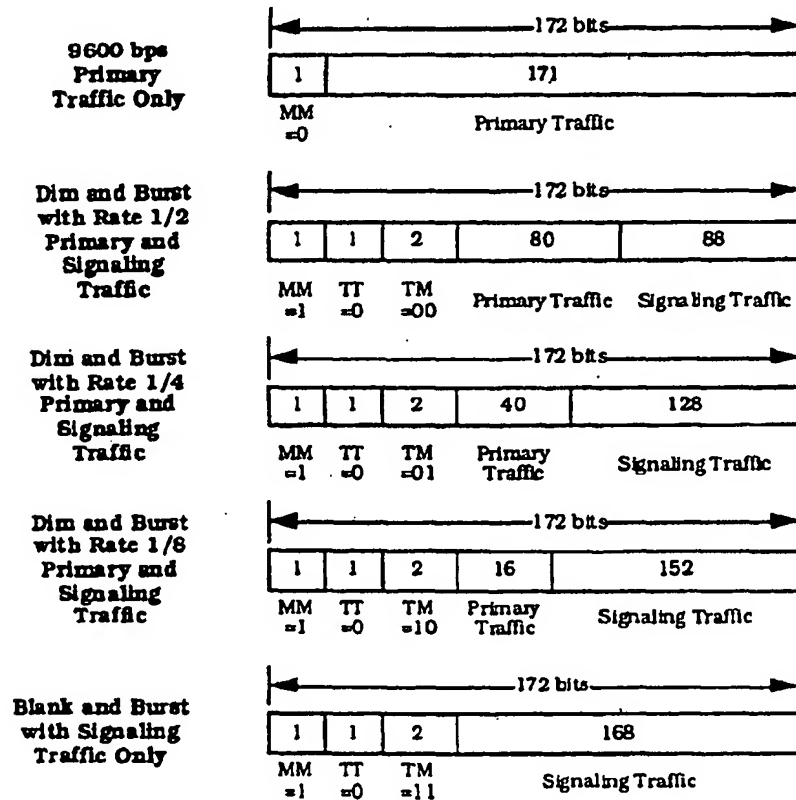


2 Table 7.1.3.5.11-1. Forward Traffic Channel Information Bits for Multiplex Option 1

Transmit Rate (bits/sec)	Format Bits			Primary Traffic	Signaling Traffic	Secondary Traffic
	Mixed Mode (MM)	Traffic Type (TT)	Traffic Mode (TM)	bits/frame	bits/frame	bits/frame
9600	'0'	-	-	171	0	0
	'1'	'0'	'00'	80	88	0
	'1'	'0'	'01'	40	128	0
	'1'	'0'	'10'	16	152	0
	'1'	'0'	'11'	0	168	0
	* '1'	'1'	'00'	80	0	88
	* '1'	'1'	'01'	40	0	128
	* '1'	'1'	'10'	16	0	152
	* '1'	'1'	'11'	0	0	168
4800	-	-	-	80	0	0
2400	-	-	-	40	0	0
1200	-	-	-	16	0	0

Note: Secondary traffic structures, marked with \*, are optional.

- 1 7.1.3.5.11.1 Primary and Signaling Traffic with Multiplex Option 1
- 2 The base station shall support the information bit structures described in
- 3 Table 7.1.3.5.11-1 and Figure 7.1.3.5.11.1-1.
- 4



## Notation

- |   |  |
|---|--|
| MM - Mixed Mode Bit   | TM - Traffic Mode Bits   |
| 0 - Primary Traffic Only  | 00 - 80 Primary Traffic Bits and either 88 Signaling Traffic or 88 Secondary Traffic Bits        |
| 1 - Primary Traffic and/or Signaling Traffic or Secondary Traffic | 01 - 40 Primary Traffic Bits and either 128 Signaling Traffic Bits or 128 Secondary Traffic Bits |
| TT - Traffic Type Bit   | 10 - 16 Primary Traffic Bits and either 152 Signaling Traffic Bits or 152 Secondary Traffic Bits |
| 0 - Signaling Traffic   | 11 - 168 Signaling Traffic Bits or 168 Secondary Traffic Bits                                    |
| 1 - Secondary Traffic   |  |

5 Figure 7.1.3.5.11.1-1. Information Bits for Primary Traffic and Signaling Traffic

6 (Part 1 of 2)

7

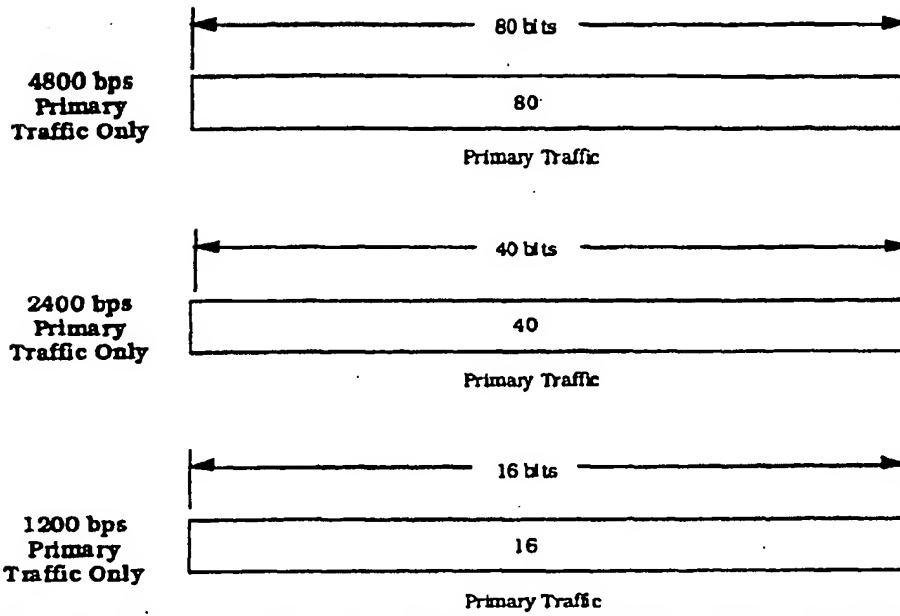
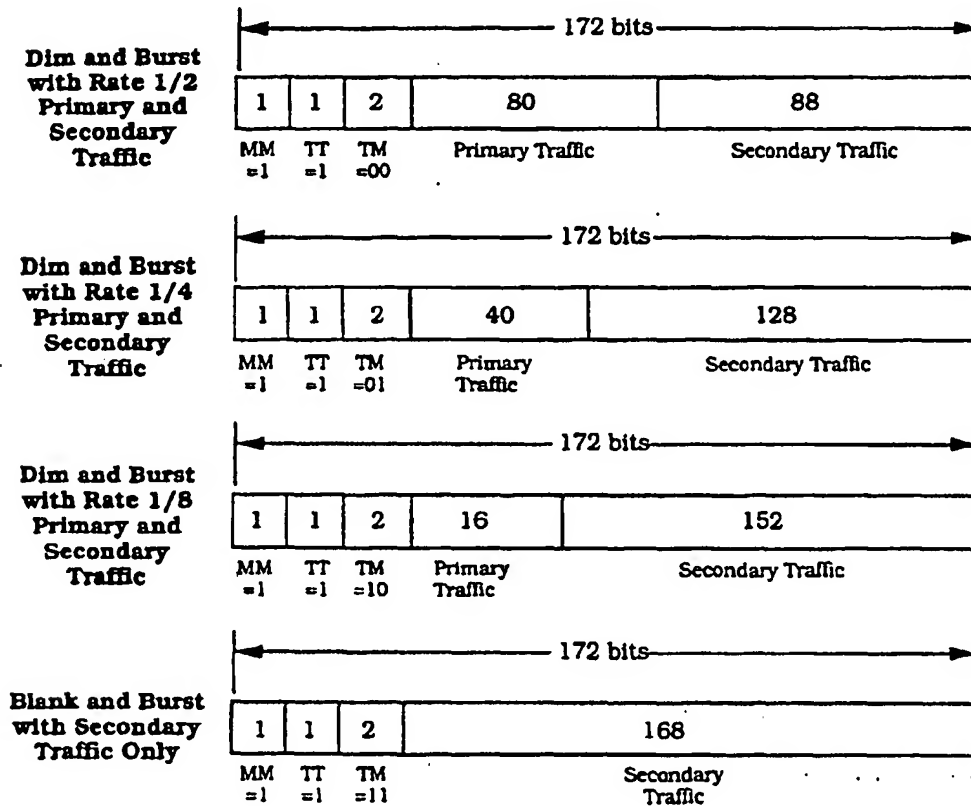


Figure 7.1.3.5.11.1-1. Information Bits for Primary Traffic and Signaling Traffic  
(Part 2 of 2)

## 7.1.3.5.11.2 Secondary Traffic with Multiplex Option 1

If the base station supports secondary traffic, the base station shall use the information bit structures described in Table 7.1.3.5.11-1 and Figure 7.1.3.5.11.2-1.



## Notation

MM - Mixed Mode Bit

0 - Primary Traffic Only

1 - Primary Traffic and/or Signaling Traffic or Secondary Traffic

TT - Traffic Type Bit

0 - Signaling Traffic

1 - Secondary Traffic

TM - Traffic Mode Bits

00 - 80 Primary Traffic Bits and either

88 Signaling Traffic or

88 Secondary Traffic Bits

01 - 40 Primary Traffic Bits and either

128 Signaling Traffic Bits or

128 Secondary Traffic Bits

10 - 16 Primary Traffic Bits and either

152 Signaling Traffic Bits or

152 Secondary Traffic Bits

11 - 168 Signaling Traffic Bits or

168 Secondary Traffic Bits

Figure 7.1.3.5.11.2-1. Information Bits for Secondary Traffic

### 7.1.3.5.11.3 Use of Various Information Bit Formats for Multiplex Option 1

When neither a primary traffic service option nor a secondary traffic service option is active, the base station shall transmit signaling traffic using only blank-and-burst frames. When not transmitting signaling traffic, the base station shall transmit only null Traffic Channel data frames.

When a primary traffic service option is active and a secondary traffic service option is not active, the base station shall use the information formats specified in 7.1.3.5.11.1. The base station shall not transmit null Traffic Channel data. The base station should use the dim-and-burst information formats specified in 7.1.3.5.11.1 for signaling traffic.

When a primary traffic service option is not active and a secondary traffic service option is active, the base station shall use the information formats specified in 7.1.3.5.11.2 to transmit secondary traffic. The base station shall use the blank-and-burst format 2 specified in 7.1.3.5.11.1 for signaling traffic. The base station shall transmit null Traffic Channel data when neither secondary traffic nor signaling traffic is to be sent.

When both a primary traffic service option and a secondary traffic service option are active, the base station shall use the information formats specified in 7.1.3.5.11.1 and 7.1.3.5.11.2. The base station shall not transmit null Traffic Channel data. The base station should use the dim-and-burst information formats specified in 7.1.3.5.11.1 for signaling traffic.

### 7.1.3.5.11.4 Control of Service Options for Multiplex Option 1

Multiplex Option 1 controls the number of bits that the service option supplies for a frame (see IS-96 "Speech Service Option Standard for Wideband Spread Spectrum Digital Cellular System").

The base station shall use the following rules when a primary traffic service option is active: If signaling traffic is to be transmitted in a frame, Multiplex Option 1 shall either restrict the primary traffic service option to generate zero bits (for a blank-and-burst frame) or to generate less than 171 bits (for a dim-and-burst frame). If secondary traffic is to be transmitted in a frame, Multiplex Option 1 may restrict the primary traffic service option to generate less than 171 bits but shall allow the primary traffic service option to generate at least 16 bits. In all other cases, Multiplex Option 1 should allow the primary traffic service option to generate either 16, 40, 80, or 171 bits for a frame.

## 7.1.4 Limitations on Emissions

### 7.1.4.1 Bandwidth Occupied

Modulation products in a bandwidth of 30 kHz centered  $\pm 750$  kHz from the CDMA Channel center frequency shall be at least 45 dB below the mean output power level.

#### 7.1.4.2 Conducted Spurious Emissions

##### 7.1.4.2.1 Suppression Inside Cellular Band

For all frequencies within the cellular base station's transmit band between 869 and 894 MHz which are also within the specific bands allocated to the operator's system (see Table 6.1.1.1-1), the total spurious emissions in any 30 kHz band shall be attenuated below the mean output power level in accordance with the following schedule:

(a) for offset frequencies greater than 750 kHz from the CDMA Channel center frequency, at least 45 dB.

(b) for offset frequencies greater than 1.98 MHz from the CDMA Channel center frequency, at least 60 dB.

For all frequencies not within the specific bands allocated to the operator's system (see Table 6.1.1.1-1), the total spurious emissions in any 30 kHz band shall not exceed a level of 60 dB below the mean output power level or -13 dBm, whichever is smaller.

##### 7.1.4.2.2 Suppression Outside Cellular Band

Current FCC rules shall apply.

#### 7.1.4.3 Radiated Spurious Emissions

Radiated spurious emissions (from sources other than the antenna connector) shall meet the levels corresponding to the conducted spurious requirements listed in 7.1.4.2.

#### 7.1.4.4 Intermodulation

Radiated products from co-located transmitters shall not exceed FCC spurious and harmonic level requirements that would apply to any of the transmitters operated separately.

### 7.1.5 Synchronization, Timing, and Phase

#### 7.1.5.1 Timing Reference Source

Each base station shall use a time base reference from which all time critical CDMA transmission components, including pilot PN sequences, frames, and Walsh functions, shall be derived. The time base reference shall be time-aligned to CDMA System Time, as described in 1.2. Reliable external means should be provided at each base station to synchronize each base station's time base reference to CDMA System Time. Each base station should use a frequency reference of sufficient accuracy to maintain time alignment to CDMA System Time. In the event that the external source of System Time is lost,<sup>9</sup> the

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<sup>9</sup>These guidelines on time keeping requirements reflect the fact that the amount of time error between base stations that can be tolerated in a CDMA network is not a hard limit. Each mobile station can search an ever increasing time window as directed by the base stations. However, increasing this window gradually degrades performance since wider windows require a longer time for the mobile stations to search out and locate the various arrivals from all base stations that may be in view. An

1 system shall maintain the base station transmit time within the tolerance specified in  
2 7.1.5.2 for a period of time specified in IS-97 "Recommended Minimum Performance  
3 Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular  
4 Mobile Stations."

5 7.1.5.2 Base Station Transmission Time

6 All base stations should radiate the pilot PN sequence within  $\pm 3 \mu\text{s}$  of CDMA System Time  
7 and shall radiate the pilot PN sequence within  $\pm 10 \mu\text{s}$  of CDMA System Time. All CDMA  
8 Channels radiated by a base station shall be within  $\pm 1 \mu\text{s}$  of each other.

9 Time measurements are made at the base station antenna connector. If a base station has  
10 multiple radiating antenna connectors for the same CDMA channel, time measurements are  
11 made at the antenna connector having the earliest radiated signal.

12 The rate of change for timing corrections shall not exceed 1/8 PN chip (101.725 ns) per 200  
13 ms.

14 7.1.5.3 Pilot to Walsh Cover Time Tolerance

15 The time error between the pilot PN sequence and all Walsh cover sequences sharing a  
16 common Forward CDMA Channel shall be less than  $\pm 50 \text{ ns}$ .

17 7.1.5.4 Pilot to Walsh Cover Phase Tolerance

18 The phase difference between the RF carrier of the Pilot Channel and the RF carrier of any  
19 other code channels on the same forward CDMA Channel emitted by the base station shall  
20 not exceed 0.05 radian.

21 7.1.6 Transmitter Performance Requirements

22 System performance is predicated on transmitters meeting the requirements set forth in  
23 IS-97 "Recommended Minimum Performance Standards for Base Stations Supporting  
24 Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations."

25 7.2 Receiver

26 7.2.1 Frequency Parameters

27 7.2.1.1 Channel Spacing and Designation

28 Channel spacing and designations for the base station reception shall be as specified in  
29 2.1.1.1.

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eventual limit on time errors occurs since pilot addresses are derived as 64 chip time shifts of a length 32768 chip sequence. In a very extreme case where the maximum number of 512 sequences were assigned to base stations, these address sequences would be 64 chips apart. In this situation it is possible that large time errors between base station transmissions would be confused with path-delayed arrivals from a given base station.

## 7.2.2 Demodulation Characteristics

The base station demodulation process shall perform complementary operations to the mobile station modulation process on the Reverse CDMA Channel (see 6.1.3).

The base station receiver shall support the closed loop power control sub-channel as specified in section 7.1.3.1.7.

The Reverse Traffic Channel frame is described in 6.1.3.3.2. A base station may implement staggered Reverse Traffic Channel frames as described in 6.1.3.3.1.

## 7.2.3 Limitations on Emissions

Current FCC rules shall apply.

## 7.2.4 Receiver Performance Requirements

System performance is predicated on receivers meeting the requirements set forth in IS-97 "Recommended Minimum Performance Standards for Base Stations Supporting Wideband Spread Spectrum Cellular Mobile Stations."

## 7.3 Security and Identification

### 7.3.1 Authentication

The base station may be equipped with a database that includes unique mobile station authentication keys and/or shared secret data for each registered mobile station in the system. This database is used for authentication of mobile stations that are equipped for authentication operation.

If the base station supports mobile station authentication, it shall provide the following capabilities: The base station shall send and receive authentication messages and perform the authentication calculations described in 6.3.12.1. The base station shall set the RAND parameter of the *Access Parameters Message* to the same value transmitted on the forward analog control channel (see 2.3.12.1.2).

### 7.3.2 Encryption

If the base station supports mobile station authentication (see 7.3.1), it may also support message encryption by providing the capability to send encryption control messages and to perform the operations of encryption and decryption as specified in 6.3.12.2.

### 7.3.3 Voice Privacy

If the base station supports mobile station authentication (see 7.3.1), it may also support voice privacy using the private long code mask, as specified in 6.3.12.3.

## 7.4 Supervision

### 7.4.1 Access Channel

The base station shall continually monitor each active Access Channel. The base station should provide control in cases of overload by using the *Access Parameters Message*.



- 1 The base station shall check the CRC of all received Access Channel messages (see  
2 6.7.1.2.2). The base station shall consider any message with a CRC that checks to be valid.  
3 The base station shall ignore any message which is not valid.

#### 4 7.4.2 Reverse Traffic Channel

- 5 The base station shall continually monitor each active Reverse Traffic Channel to determine  
6 if the call is active. If the base station detects that the call is no longer active, the base  
7 station shall declare loss of Reverse Traffic Channel continuity (see 7.6.4).

- 8 The base station shall check the CRC of all received Reverse Traffic Channel messages (see  
9 6.7.2.2.2). The base station shall consider any message with a CRC that checks to be valid.  
10 The base station shall ignore any message which is not valid.

#### 11 7.5 Malfunction Detection

12 Reserved.

#### 13 7.6 Call Processing

- 14 This section describes base station call processing. It contains frequent references to the  
15 messages that flow between the base station and the mobile station. While reading this  
16 section, it may be helpful to refer to the message formats (see 6.7 and 7.7), and to the call  
17 flow examples (see Appendix B).

- 18 The values for the time and numeric constants used in this section (e.g.,  $T_{1b}$  and  $N_{4m}$ ) are  
19 specified in Appendix D.

20 Base station call processing consists of the following types of processing:

- 21 • *Pilot and Sync Channel Processing* - During *Pilot and Sync Channel Processing*, the  
22 base station transmits the Pilot Channel and Sync Channel which the mobile station  
23 uses to acquire and synchronize to the CDMA system while the mobile station is in  
24 the *Mobile Station Initialization State*.
- 25 • *Paging Channel Processing* - During *Paging Channel Processing*, the base station  
26 transmits the Paging Channel which the mobile station monitors to receive messages  
27 while the mobile station is in the *Mobile Station Idle State* and the *System Access*  
28 *State*.
- 29 • *Access Channel Processing* - During *Access Channel Processing*, the base station  
30 monitors the Access Channel to receive messages which the mobile station sends  
31 while the mobile station is in the *System Access State*.
- 32 • *Traffic Channel Processing* - During *Traffic Channel Processing*, the base station uses  
33 the Forward and Reverse Traffic Channels to communicate with the mobile station  
34 while the mobile station is in the *Mobile Station Control on the Traffic Channel State*.

##### 35 7.6.1 Pilot and Sync Channel Processing

- 36 During *Pilot and Sync Channel Processing*, the base station transmits the Pilot and Sync  
37 Channels which the mobile station uses to acquire and synchronize to the CDMA system  
38 while the mobile station is in the *Mobile Station Initialization State*.

1 7.6.1.1 Primary and Secondary CDMA Channels

2 The Primary and Secondary CDMA Channels are the CDMA Channels on which the mobile  
3 station attempts to acquire the CDMA system (see 7.1.1.1).

4 The base station shall support the Primary CDMA Channel, or the Secondary CDMA  
5 Channel, or both. The base station may support additional CDMA Channels.

6 7.6.1.2 Pilot Channel Operation

7 The Pilot Channel (see 7.1.3.2) is a reference channel which the mobile station uses for  
8 acquisition, timing, and as a phase reference for coherent demodulation.

9 The base station shall continually transmit a Pilot Channel for every CDMA Channel  
10 supported by the base station.

11 7.6.1.3 Sync Channel Operation

12 The Sync Channel (see 7.1.3.3) provides the mobile station with system configuration and  
13 timing information.

14 The base station shall transmit at most one Sync Channel for each supported CDMA  
15 Channel. If the base station supports the Primary CDMA Channel, the base station shall  
16 transmit a Sync Channel on the Primary CDMA Channel. If the base station does not  
17 support the Primary CDMA Channel, the base station shall transmit a Sync Channel on the  
18 Secondary CDMA Channel.

19 The base station shall continually send the *Sync Channel Message* on each Sync Channel  
20 that the base station transmits.

21 7.6.2 Paging Channel Processing

22 During *Paging Channel Processing*, the base station transmits the Paging Channel (see  
23 7.1.3.4) which the mobile station monitors to receive messages while the mobile station is  
24 in the *Mobile Station Idle State* and the *System Access State*.

25 The base station may transmit up to seven Paging Channels on each supported CDMA  
26 Channel. For each supported CDMA Channel for which the base station transmits a Sync  
27 Channel, the base station shall transmit at least one Paging Channel.

28 For each Paging Channel that the base station transmits, the base station shall continually  
29 send valid Paging Channel messages (see 7.7.2), which may include the *Null Message*.

30 The base station shall not send any message which is not completely contained within 2  
31 consecutive Paging Channel slots, unless the processing requirements for the message  
32 explicitly specify a different size limitation.<sup>10</sup>

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<sup>10</sup>See, for example, IS-637 which specifies processing requirements for the *Data Burst Message*.

### 7.6.2.1 Paging Channel Procedures

#### 7.6.2.1.1 CDMA Channel Determination

To determine the mobile station's assigned CDMA Channel, the base station shall use the hash function specified in 6.6.7.1 with the following inputs:

- Mobile station's MIN or IMSI\_S.
- Number of CDMA Channels on which the base station transmits Paging Channels.

#### 7.6.2.1.2 Paging Channel Determination

To determine the mobile station's assigned Paging Channel, the base station shall use the hash function specified in 6.6.7.1 with the following inputs:

- Mobile station's MIN or IMSI\_S.
- Number of Paging Channels which the base station transmits on the mobile station's assigned CDMA Channel.

#### 7.6.2.1.3 Paging Slot Determination

To determine the assigned Paging Channel slots for a mobile station with a given slot cycle index, the base station shall select a number PGSLOT using the hash function specified in 6.6.7.1 with the following inputs:

- Mobile station's MIN or IMSI\_S.
- Maximum number of Paging Channel slots (2048).

The assigned Paging Channel slots for the mobile station are those slots for which

$$\lfloor t/4 \rfloor - \text{PGSLOT} \bmod (16 \times T) = 0,$$

where  $t$  is the System Time in frames, and  $T$  is the slot cycle length in units of 1.28 seconds given by

$$T = 2^i,$$

where  $i$  is the slot cycle index.

#### 7.6.2.1.4 Message Transmission and Acknowledgement Procedures

The Paging Channel acknowledgement procedures facilitate the reliable exchange of messages between the base station and the mobile station on the Paging Channel and Access Channel (see 7.6.3.1.1). The base station uses the fields ACK\_TYPE (acknowledgement address type), ACK\_SEQ (acknowledgement sequence number), MSG\_SEQ (message sequence number), ACK\_REQ (acknowledgement required), and VALID\_ACK (valid acknowledgement) to support this mechanism. These fields are referred to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2 procedures. All other message fields and the processing thereof are referred to as pertaining to layer 3. (See Appendix C for further discussion of layering.)

Paging Channel messages other than the *Page Message*, *Slotted Page Message*, and *General Page Message* can be addressed, by means of the ADDRESS field, to either a specific mobile

- 1 station, a specific MIN, or a specific IMSI. The *Page Message* and *Slotted Page Message* can  
2 only be addressed to a specific MIN; the *General Page Message* can only be addressed to a  
3 specific IMSI. Since MINs and IMSIs can be active in more than one mobile station,  
4 separate acknowledgement and message sequence numbering procedures are used for each  
5 type of message address.<sup>11</sup>
- 6 The base station shall set the ACK\_SEQ and VALID\_ACK fields of all Paging Channel  
7 messages as specified in 7.6.3.1.1.
- 8 For mobile station directed messages, the base station shall use the message address types  
9 specified in Table 7.7.2.3.1-1. The base station shall not use both the MIN (ADDR\_TYPE set  
10 equal to '000') and IMSI (ADDR\_TYPE set equal to '010') when addressing a specific mobile  
11 station. When paging the mobile station, the base station shall use either the *Page*  
12 *Message*, *Slotted Page Message*, or *General Page Message* (see 7.6.2.3). The base station  
13 shall not send the *General Page Message* unless it is sending the *Extended System*  
14 *Parameters Message*.
- 15 The base station shall maintain independent message numbering sequences (MSG\_SEQ) on  
16 the Paging Channel for each message address type (i.e., for each value of the ADDR\_TYPE  
17 field that is used) and for each address. The records of the *Page Message* and *Slotted Page*  
18 *Message* shall be considered to be addressed by MIN (as if ADDR\_TYPE were equal to '000').  
19 The records of the *General Page Message* shall be considered to be addressed by IMSI (as if  
20 ADDR\_TYPE were equal to '010').
- 21 For each message address type, separate message numbering sequences shall be  
22 maintained for messages requiring acknowledgement and for messages not requiring  
23 acknowledgement. Each base station may maintain the sequence numbers independently of  
24 other base stations. For each new message sent to a message address, the base station  
25 shall increment the appropriate MSG\_SEQ value, modulo 8.
- 26 The base station shall wait at least  $T_{4m}$  seconds after transmitting a MSG\_SEQ number in  
27 a message sent to a message address before using the same MSG\_SEQ number in a  
28 different message (see Figure 7.6.2.1.4-1).
- 29 The base station may send a message several times to increase the probability of message  
30 reception. The base station shall complete all retransmissions of the same message within  
31  $T_{4m}$  seconds after the first transmission, as shown in Figure 7.6.2.1.4-1. If the base station  
32 sends a message with the same contents more than  $T_{4m}$  seconds after the first  
33 transmission, it shall use a different message sequence number.
- 34 A message received on the Access Channel contains an acknowledgement if the VALID\_ACK  
35 field is '1'. When the base station receives a message with VALID\_ACK set to '1', it shall use  
36 the received ACK\_TYPE, ACK\_SEQ and mobile station identification fields to determine the  
37 message that is being acknowledged. The base station should not retransmit a message  
38 requiring acknowledgement after it has received an acknowledgement of the message.

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<sup>11</sup> Individual systems may or may not allow these capabilities. The management of these capabilities is a function of the base station and system operator.

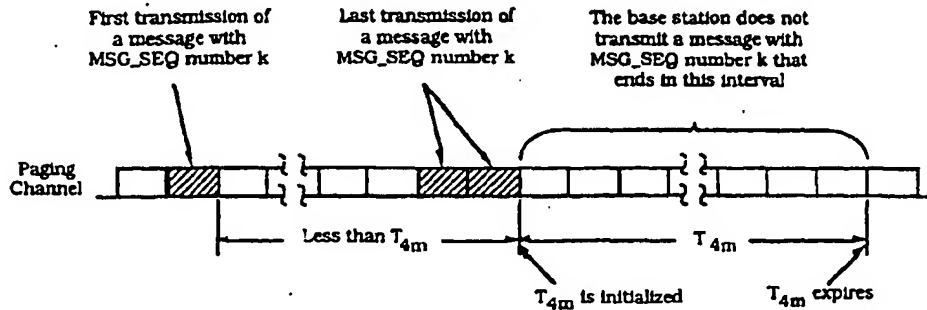


Figure 7.6.2.1.4-1. MSG\_SEQ Reuse

#### 7.6.2.1.5 Paging Channel Address Composition

##### 7.6.2.1.5.1 Paging Channel Address Composition for Other than Page Messages

When the base station sends Paging Channel messages directed to a specific mobile station, the base station shall use the mobile station ESN, MIN, or IMSI to address the mobile station.

If the message is addressed to the mobile station's MIN or ESN, the base station shall set the addressing fields as described in 7.7.2.3.1.

If the message is addressed to the mobile station's IMSI, the base station shall set the addressing fields as described in 7.7.2.3.1 and shall set the IMSI\_CLASS, IMSI\_CLASS\_0\_TYPE, and IMSI\_CLASS\_1\_TYPE fields as follows:

- The base station may address the mobile station with an IMSI\_CLASS equal to '0' and IMSI\_CLASS\_0\_TYPE equal to '00' if all the following conditions are true:
  - The mobile station has been assigned a class 0 IMSI,
  - The IMSI<sub>11\_12</sub> assigned to the mobile station is equal to the IMSI<sub>11\_12</sub> sent in the *Extended System Parameters Message* by the base station (see 7.7.2.3.2.13), and
  - The MCC assigned to the mobile station is equal to the MCC sent in the *Extended System Parameters Message* by the base station.
- The base station may address the mobile station with an IMSI\_CLASS equal to '0' and IMSI\_CLASS\_0\_TYPE equal to '01' if all the following conditions are true:
  - The mobile station has been assigned a class 0 IMSI, and
  - The MCC assigned to the mobile station is equal to the MCC sent in the *Extended System Parameters Message* by the base station.
- The base station may address the mobile station with an IMSI\_CLASS equal to '0' and IMSI\_CLASS\_0\_TYPE equal to '10' if all the following conditions are true:
  - The mobile station has been assigned a class 0 IMSI, and

- 1       - The IMSI\_11\_12 assigned to the mobile station is equal to the IMSI\_11\_12 sent
- 2       in the *Extended System Parameters Message* by the base station.
- 3       • The base station may address the mobile station with an IMSI\_CLASS equal to '0' and
- 4       IMSI\_CLASS\_0\_TYPE equal to '11' if the following condition is true:
- 5       - The mobile station has been assigned a class 0 IMSI.
- 6       • The base station may address the mobile station with an IMSI\_CLASS equal to '1' and
- 7       IMSI\_CLASS\_1\_TYPE equal to '0' if all the following conditions are true:
- 8       - The mobile station has been assigned a class 1 IMSI, and
- 9       - The MCC assigned to the mobile station is equal to the MCC sent in the
- 10      *Extended System Parameters Message* by the base station.
- 11      • The base station may address the mobile station with an IMSI\_CLASS equal to '1' and
- 12      IMSI\_CLASS\_1\_TYPE equal to '1' if the following condition is true:
- 13      - The mobile station has been assigned a class 1 IMSI.

#### 14   7.6.2.1.5.2 Paging Channel Address Composition for Page Messages

15   When sending a *Slotted Page Message* (see 7.7.2.3.2.5) or *Page Message* (see 7.7.2.3.2.6) to  
 16   the mobile station, the base station should include both MIN1 and MIN2 in a page record if  
 17   one of the mobile station's home (SID, NID) pairs does not match the SID and NID of the  
 18   base station.

19   When sending a *General Page Message* (see 7.7.2.3.2.17) to the mobile station, the base  
 20   station shall use the following procedures:

- 21      • The base station may page the mobile station using a page record with PAGE\_CLASS  
 22      equal to '00' and PAGE\_SUBCLASS equal to '00' if all the following conditions are  
 23      met:
- 24      - The mobile station has been assigned a class 0 IMSI,
- 25      - The IMSI\_11\_12 assigned to the mobile station is equal to the IMSI\_11\_12 sent  
 26      in the *Extended System Parameters Message* by the base station (see  
 27      7.7.2.3.2.13), and
- 28      - The MCC assigned to the mobile station is equal to the MCC sent in the  
 29      *Extended System Parameters Message* by the base station.
- 30      • The base station may page the mobile station using a page record with PAGE\_CLASS  
 31      equal to '00' and PAGE\_SUBCLASS equal to '01' if all the following conditions are  
 32      met:
- 33      - The mobile station has been assigned a class 0 IMSI, and
- 34      - The MCC assigned to the mobile station is equal to the MCC sent in the  
 35      *Extended System Parameters Message* by the base station.
- 36      • The base station may page the mobile station using a page record with PAGE\_CLASS  
 37      equal to '00' and PAGE\_SUBCLASS equal to '10' if all the following conditions are  
 38      met:

- 1       - The mobile station has been assigned a class 0 IMSI, and
- 2       - The IMSI\_11\_12 assigned to the mobile station is equal to the IMSI\_11\_12 sent
- 3       in the *Extended System Parameters Message* by the base station.
- 4       • The base station may page the mobile station using a page record with PAGE\_CLASS
- 5       equal to '00' and PAGE\_SUBCLASS equal to '11' if the following condition is met:
- 6       - The mobile station has been assigned a class 0 IMSI.
- 7       • The base station may page the mobile station using a page record with PAGE\_CLASS
- 8       equal to '01' and PAGE\_SUBCLASS equal to '00' if all the following conditions are
- 9       met:
- 10      - The mobile station has been assigned a class 1 IMSI, and
- 11      - The MCC assigned to the mobile station is equal to the MCC sent in the
- 12      *Extended System Parameters Message* by the base station.
- 13      • The base station may page the mobile station using a page record with PAGE\_CLASS
- 14      equal to '01' and PAGE\_SUBCLASS equal to '01' if the following condition is met:
- 15      - The mobile station has been assigned a class 1 IMSI.
- 16      • The base station may announce the presence of broadcast *Data Burst Messages* on
- 17      the Paging Channel by paging, using a broadcast address with PAGE\_CLASS equal to
- 18      '11' and PAGE\_SUBCLASS equal to '00'.

#### 19   7.6.2.2 Overhead Information

20   The base station sends overhead messages to provide the mobile station with the

21   information it needs to operate with the base station.

22   The base station shall maintain a configuration sequence number (CONFIG\_SEQ), and shall

23   increment CONFIG\_SEQ modulo 64 whenever the base station modifies the *System*

24   *Parameters Message*, the *Neighbor List Message*, the *CDMA Channel List Message*, or, if

25   sent, the *Extended System Parameters Message* and the *Global Service Redirection Message*.

26   The base station shall maintain an access configuration sequence number

27   (ACC\_CONFIG\_SEQ), and shall increment ACC\_CONFIG\_SEQ modulo 64 whenever the

28   base station modifies the *Access Parameters Message*.

29   On each of the Paging Channels the base station transmits, the base station shall send

30   each of the following system overhead messages at least once per  $T_{16}$  seconds:

- 31   1. *Access Parameters Message*
- 32   2. *CDMA Channel List Message*
- 33   3. *Neighbor List Message*
- 34   4. *System Parameters Message*

35   If the base station uses addressing modes requiring use of the IMSI or if periodic broadcast

36   paging is enabled with a value of the broadcast slot cycle index that is not equal to the

37   default value (see 2.4.2.3.2.3. of TIA/EIA/IS-637), the base station shall send the *Extended*

1 *System Parameters Message* overhead message on each of the Paging Channels the base  
 2 station transmits. If the base station is sending the *Extended System Parameters Message*,  
 3 it shall send it at least once per  $T_{1b}$  seconds.

4 The base station may send a *Global Service Redirection Message* on any given Paging  
 5 Channel. If the message is sent, the base station shall send it at least once per  $T_{1b}$   
 6 seconds.

#### 7 7.6.2.3 Mobile Station Directed Messages

8 The base station shall use the following rules for selecting the Paging Channel slot in which  
 9 to send a message to a mobile station:

- 10 • If the base station is able to determine that the mobile station is operating in the  
 11 non-slotted mode, the base station may send the message to the mobile station in  
 12 any Paging Channel slot.
- 13 • If the base station is able to determine that the mobile station is operating in the  
 14 slotted mode and is able to determine the mobile station's slot cycle index (see  
 15 6.6.2.1.1.3), the base station shall send the message, at least once, as follows:
  - 16 1. The base station shall send the message in an assigned Paging Channel slot for  
 17 the mobile station (see 7.6.2.1.3); and
  - 18 2. The base station shall not send the message in the assigned Paging Channel slot  
 19 after sending a *Slotted Page Message* with MORE\_PAGES set to '0' in that slot.
  - 20 3. If the mobile station has been assigned a class 0 IMSI, the base station shall not  
 21 send the message in the assigned Paging Channel slot after sending a *General*  
 22 *Page Message* with CLASS\_0\_DONE set to '1' in that slot.
  - 23 4. If the mobile station has been assigned a class 1 IMSI, the base station shall not  
 24 send the message in the assigned Paging Channel slot after sending a *General*  
 25 *Page Message* with CLASS\_1\_DONE set to '1' in that slot.
- 26 • If the base station is not able to determine whether the mobile station is operating in  
 27 the non-slotted mode, or the base station is not able to determine the mobile station's  
 28 slot cycle index, the base station shall assume that the mobile station is operating in  
 29 the slotted mode with a slot cycle index which is the smaller of  
 30 MAX\_SLOT\_CYCLE\_INDEX and 1. The base station shall send the message, at least  
 31 once, as follows:
  - 32 1. The base station shall send the message in an assigned Paging Channel slot for  
 33 the mobile station (see 7.6.2.1.3); and
  - 34 2. The base station shall not send the message in the assigned Paging Channel slot  
 35 after sending a *Slotted Page Message* with MORE\_PAGES set to '0' in that slot.
  - 36 3. If the mobile station has been assigned a class 0 IMSI, the base station shall not  
 37 send the message in the assigned Paging Channel slot after sending a *General*  
 38 *Page Message* with CLASS\_0\_DONE set to '1' in that slot.



- 1           4. If the mobile station has been assigned a class 1 IMSI, the base station shall not  
2           send the message in the assigned Paging Channel slot after sending a *General*  
3           *Page Message* with CLASS\_1\_DONE set to '1' in that slot.

4           If the base station is addressing mobile stations using MINs, the base station should send  
5           at least one *Slotted Page Message* in each Paging Channel slot (see 7.7.2.1.1). If the base  
6           station is addressing mobile stations using IMSIs, the base station should send at least one  
7           *General Page Message* in each Paging Channel slot. The base station shall not omit a  
8           slotted page message in two adjacent slots. The base station should send messages  
9           directed to mobile stations operating in the slotted mode as the first messages in the slot.

10          The base station may send the following messages directed to a mobile station on the  
11          Paging Channel. If the base station sends a message, the base station shall comply with  
12          the specified requirements for sending the message, if any.

- 13          1. Abbreviated Alert Order
- 14          2. Audit Order
- 15          3. Authentication Challenge Message
- 16          4. Base Station Acknowledgement Order
- 17          5. Base Station Challenge Confirmation Order
- 18          6. Channel Assignment Message
- 19          7. Data Burst Message
- 20          8. Feature Notification Message
- 21          9. General Page Message: The base station shall use the IMSI as specified in  
22             7.6.2.1.5.2.
- 23          10. Intercept Order
- 24          11. Local Control Order
- 25          12. Lock Until Power-Cycled Order
- 26          13. Maintenance Required Order
- 27          14. Page Message: The base station shall include both MIN1 and MIN2 fields in the  
28             message when paging either a foreign SID roamer or a foreign NID roamer (see  
29             6.6.5.3).
- 30          15. Registration Accepted Order
- 31          16. Registration Rejected Order
- 32          17. Registration Request Order
- 33          18. Release Order
- 34          19. Reorder Order
- 35          20. Service Redirection Message

21. Slotted Page Message: The base station shall include both MIN1 and MIN2 fields in the message when paging either a foreign SID roamer or a foreign NID roamer (see 6.6.5.3).

22. SSD Update Message

23. Unlock Order

#### 7.6.2.4 Broadcast Messages

The base station may transmit *Data Burst Messages* directed to broadcast addresses. When transmitting broadcast messages that are to be received by mobile stations operating in the slotted mode, the base station may use broadcast page records (see 7.7.2.3.2.17) in accordance with the broadcast procedures specified in TIA/EIA/IS-637 to announce the presence of broadcast *Data Burst Messages* on the Paging Channel. The base station should use the rules specified in 2.4.2.3 of TIA/EIA/IS-637 for selecting the Paging Channel slot in which to send a broadcast *Data Burst Message*.

#### 7.6.3 Access Channel Processing

During *Access Channel Processing*, the base station monitors the Access Channel to receive messages which the mobile station sends while the mobile station is in the *System Access State*.

Each Access Channel is associated with a Paging Channel. Up to 32 Access Channels can be associated with a Paging Channel. The number of Access Channels associated with a particular Paging Channel is specified in the *Access Parameters Message* sent on that Paging Channel.

The base station shall continually monitor all Access Channels associated with each Paging Channel that the base station transmits.

##### 7.6.3.1 Access Channel Procedures

###### 7.6.3.1.1 Message Reception and Acknowledgement Procedures

The Access Channel acknowledgement procedures facilitate the reliable exchange of messages between the base station and the mobile station on the Paging Channel (see 7.6.2.1.4) and Access Channel. The base station uses the fields ACK\_TYPE (acknowledgement address type), ACK\_SEQ (acknowledgement sequence number), MSG\_SEQ (message sequence number), ACK\_REQ (acknowledgement required), and VALID\_ACK (valid acknowledgement) to support this mechanism. These fields are referred to as layer 2 fields, and the acknowledgement procedures are referred to as layer 2 procedures. All other message fields and the processing thereof are referred to as pertaining to layer 3. (See Appendix C for further discussion of layering.)

A message received on the Access Channel requires acknowledgement if the ACK\_REQ field is set to '1'. In this specification, all messages sent on the Access Channel require acknowledgement. All messages sent on the Access Channel contain identification data for the mobile station sending the message, and are acknowledged by Paging Channel messages.

1 The base station acknowledges a received message by transmitting a message on the Paging  
 2 Channel with the ACK\_SEQ field set equal to the MSG\_SEQ field of the received message,  
 3 and with the VALID\_ACK field set to '1'. A message transmitted with the ACK\_SEQ and  
 4 VALID\_ACK fields set in this manner is referred to as including an acknowledgement of the  
 5 received message.

6 After receiving a message requiring acknowledgement from a mobile station on the Access  
 7 Channel, the base station shall transmit a message directed to that mobile station,  
 8 including acknowledgement, on the corresponding Paging Channel. The acknowledgement  
 9 shall be transmitted within  $ACC\_TMO \times 80$  ms after receiving the message, where  
 10 ACC\_TMO is the value sent in the *Access Parameters Message* on the mobile station's  
 11 assigned Paging Channel.

12 When a received message requires acknowledgement and no message directed to the mobile  
 13 station is available within  $ACC\_TMO \times 80$  ms after the message is received, the base station  
 14 shall transmit a *Base Station Acknowledgement Order* directed to the mobile station,  
 15 including the acknowledgement.

16 Whenever a message requiring acknowledgement is received from a mobile station, the base  
 17 station shall set the ACK\_SEQ field in subsequent Paging Channel messages directed to  
 18 that mobile station, to the MSG\_SEQ specified in the received message. The VALID\_ACK  
 19 field shall be set to '1' for the first message with this value of ACK\_SEQ sent to the mobile  
 20 station on the Paging Channel. For all Paging Channel messages after the first, directed to  
 21 the same mobile station and containing the same ACK\_SEQ field value:

- 22 • The base station may set VALID\_ACK to '1' if the message is sent within  $T_{4m}$  seconds  
 23 after the first message (see Figure 7.6.2.1.4-1).
- 24 • The base station shall set VALID\_ACK field to '0' if the message is sent more than  
 25  $T_{4m}$  seconds after the first message.

26 If the base station performs duplicate message detection using Access Channel message  
 27 sequence numbers, it should use the following procedures. The base station should store,  
 28 for each mobile station that is active on the Access Channel, a received status indicator for  
 29 each possible value of the Access Channel message MSG\_SEQ field (MSG\_SEQ\_RCVD[n],  
 30 where n is 0 through 7).

31 The base station should consider a mobile station active on the Access Channel when it  
 32 receives an Access Channel message from the mobile station. The base station should  
 33 consider the mobile station inactive on the Access Channel if:

- 34 • It has received no message from the mobile station within a time period to be selected  
 35 by the base station manufacturer; or
- 36 • The mobile station has been assigned to a Traffic Channel; or
- 37 • The mobile station has been assigned to an analog system; or
- 38 • The mobile station has been directed to another system by a *Service Redirection*  
 39 *Message*, or
- 40 • The base station has received a power-down registration from the mobile station.

1 When the base station receives an Access Channel message from an inactive mobile station,  
2 it should set MSG\_SEQ\_RCVD[n] to NO for all values of n from 0 to 7. The base station  
3 should then consider the mobile station active on the Access Channel.

4 For each active mobile station, the base station should perform the following procedures:

- 5 • When a message requiring acknowledgement is received (including a message  
6 received while the mobile station was inactive), with message sequence number  
7 MSG\_SEQ, and MSG\_SEQ\_RCVD[MSG\_SEQ] is equal to NO, the base station should  
8 process the message as a new message. The base station should set  
9 MSG\_SEQ\_RCVD[MSG\_SEQ] to YES, and should set MSG\_SEQ\_RCVD[(MSG\_SEQ +  
10 2) modulo 8] to NO.
- 11 • When a message requiring acknowledgement is received, with message sequence  
12 number MSG\_SEQ, and MSG\_SEQ\_RCVD[MSG\_SEQ] is equal to YES, the base  
13 station shall acknowledge the message as specified earlier in this section but should  
14 not perform any further processing of the message.

15 7.6.3.2 Reserved

16 7.6.3.3 Response to *Page Response Message*

17 If the base station receives a *Page Response Message*, the base station should send a  
18 *Channel Assignment Message* or a *Release Order*. The base station may also start  
19 authentication procedures (see 6.3.12), send a *Data Burst Message*, or request status  
20 information records with the *Status Request Order*.

21 If the base station sends a *Channel Assignment Message*, the base station shall perform the  
22 following:

- 23 • If the *Channel Assignment Message* directs the mobile station to a Traffic Channel,  
24 the base station shall begin *Traffic Channel Processing* (see 7.6.4) for the mobile  
25 station.
- 26 • If the *Channel Assignment Message* directs the mobile station to a wide analog voice  
27 channel, the base station shall follow the procedure described in 3.6.4.
- 28 • If the *Channel Assignment Message* directs the mobile station to a narrow analog  
29 voice channel, the base station shall follow the procedure described in 3.6.5A of  
30 IS-91.

31 7.6.3.4 Response to Orders

32 No requirements.

33 7.6.3.5 Response to *Origination Message*

34 If the base station receives an *Origination Message*, the base station should send a *Channel*  
35 *Assignment Message*, an *Intercept Order*, a *Reorder Order*, or a *Release Order*. The base  
36 station may also commence authentication procedures (see 6.3.12).

37 If the base station sends a *Channel Assignment Message*, the base station shall perform the  
38 following:

- 1       • If the *Channel Assignment Message* directs the mobile station to a Traffic Channel,  
2       the base station shall begin *Traffic Channel Processing* (see 7.6.4) for the mobile  
3       station.
- 4       • If the *Channel Assignment Message* directs the mobile station to a wide analog voice  
5       channel, the base station shall follow the procedure described in 3.6.4.
- 6       • If the *Channel Assignment Message* directs the mobile station to a narrow analog  
7       voice channel, the base station shall follow the procedure described in 3.6.5A of  
8       IS-91.

9       The base station shall not set RESPOND<sub>r</sub> equal to '0' when ASSIGN\_MODE = '001' or  
10      ASSIGN\_MODE = '010'.

#### 11   7.6.3.6 Response to *Registration Message*

12   If the base station receives a *Registration Message*, the base station may send a *Registration*  
13   *Accepted Order*, *Service Redirection Message*, or a *Registration Rejected Order*. The base  
14   station may also start authentication procedures (see 6.3.12.1).

#### 15   7.6.3.7 Response to *Data Burst Message*

16   No requirements.

#### 17   7.6.4 Traffic Channel Processing

18   During *Traffic Channel Processing*, the base station uses the Forward and Reverse Traffic  
19   Channels to communicate with the mobile station while the mobile station is in the *Mobile*  
20   *Station Control on the Traffic Channel State*.

21   Traffic Channel processing consists of the following substates:

- 22       • *Traffic Channel Initialization Substate* - In this substate, the base station begins  
23       transmitting on the Forward Traffic Channel and receiving on the Reverse Traffic  
24       Channel.
- 25       • *Waiting for Order Substate* - In this substate, the base station sends the *Alert With*  
26       *Information Message* to the mobile station.
- 27       • *Waiting for Answer Substate* - In this substate, the base station waits for the *Connect*  
28       *Order* from the mobile station.
- 29       • *Conversation Substate* - In this substate, the base station exchanges primary traffic  
30       bits with the mobile station's primary service option application.
- 31       • *Release Substate* - In this substate, the base station disconnects the call.

#### 32   7.6.4.1 Special Functions and Actions

33   The base station performs the following special functions and actions in one or more of the  
34   Traffic Channel processing substates.

1    7.6.4.1.1 Forward Traffic Channel Power Control

2    When the base station enables Forward Traffic Channel power control, the mobile station  
3    reports frame error rate statistics to the base station using the *Power Measurement Report*  
4    *Message*.

5    The base station may enable Forward Traffic Channel power control using the *System*  
6    *Parameters Message* sent on the Paging Channel and the *Power Control Parameters*  
7    *Message* sent on the Forward Traffic Channel. The base station may enable periodic  
8    reporting which causes the mobile station to report frame error rate statistics at specified  
9    intervals. The base station may also enable threshold reporting which causes the mobile  
10   station to report frame error rate statistics when the frame error rate reaches a specified  
11   threshold.<sup>12</sup>

12   The base station may use the reported frame error rate statistics to adjust the transmit  
13   power of the Forward Traffic Channel.

14   7.6.4.1.2 Service Options

15   7.6.4.1.2.1 Overview

16   During Traffic Channel operation, the base station and mobile station may support primary  
17   traffic services. Each such service, referred to as a service option, has a set of requirements  
18   that govern the way in which the primary traffic bits (see 7.1.3.5.11 and 6.1.3.3.11) from  
19   forward and reverse Traffic Channel frames are processed by the base station and mobile  
20   station. Service Option 1, for example, defines the requirements for a 2-way, variable rate  
21   speech service.

22   Either the base station or mobile station can request a service option. The base station can  
23   request a particular service option when paging the mobile station or during Traffic  
24   Channel operation. If the requested service option is acceptable to the mobile station, the  
25   base station and mobile station begin using the new service option. If the base station  
26   requests a service option that is not acceptable to the mobile station, the mobile station can  
27   reject the requested service option or request an alternative service option. If the mobile  
28   station requests an alternative service option, the base station can accept or reject the  
29   mobile station's alternative service option, or request another service option. This process,  
30   called service option negotiation, ends when the base station and mobile station find a  
31   mutually acceptable service option, or when the base station rejects a service option  
32   request from the mobile station or the mobile station rejects a service option request from  
33   the base station.

34   The base station and mobile station use the *Service Option Request Order* either to request a  
35   service option or suggest an alternative service option, and the *Service Option Response*  
36   *Order* to accept or reject a service option request. In addition, the base station can request  
37   a service option in the *General Page Message*, the *Page Message* or the *Slotted Page*  
38   *Message*, and the mobile station can request a service option in the *Origination Message* or

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<sup>12</sup>Both periodic and threshold reporting may be enabled simultaneously, either one of them may be enabled, or both forms of reporting may be disabled at any given time.

1 the *Page Response Message*. The base station and mobile station use the *Service Option*  
2 *Control Order* to invoke service option specific functions.

3 The base station uses a variable (SO\_REQ) to record the number of the service option for  
4 which the base station has sent an outstanding request in a *Service Option Request Order*.  
5 SO\_REQ is set to a special value, NULL, when the base station does not have an  
6 outstanding service option request. The base station uses another variable (SO\_CUR) to  
7 record the number of the service option which is currently active. SO\_CUR is set to NULL  
8 when there is no active service option.

#### 9 7.6.4.1.2.2 Requirements

##### 10 7.6.4.1.2.2.1 Processing Service Option Requests

11 When processing a service option request in an *Origination Message*, a *Page Response*  
12 *Message*, or a *Service Option Request Order*, the base station shall perform the following:

- 13 • If the base station accepts the requested service option, the base station shall set  
14 SO\_REQ to NULL and shall send a *Service Option Response Order* accepting the  
15 requested service option within  $T_{4b}$  seconds. The base station shall begin using the  
16 requested service option in accordance with the requirements for the requested  
17 service option. The base station shall set SO\_CUR to the requested service option  
18 number when the service option becomes active.
- 19 • If the base station does not accept the requested service option and has an  
20 alternative service option to request, the base station shall set SO\_REQ to the  
21 alternative service option number and shall send a *Service Option Request Order*  
22 requesting the alternative service option within  $T_{4b}$  seconds.
- 23 • If the base station does not accept the requested service option and does not have an  
24 alternative service option to request, the base station shall set SO\_REQ to NULL and  
25 shall send a *Service Option Response Order* to reject the request within  $T_{4b}$  seconds.  
26 The base station shall continue to process primary traffic as it did prior to receiving  
27 the *Service Option Request Order* and shall remain in the current state.

##### 28 7.6.4.1.2.2.2 Processing the *Service Option Response Order*

29 When the base station receives a *Service Option Response Order*, it shall perform the  
30 following:

- 31 • If the service option number specified in the order is equal to SO\_REQ, the base  
32 station shall set SO\_REQ to NULL and shall begin using the specified service option  
33 in accordance with the requirements for the service option. The base station shall set  
34 SO\_CUR to the specified service option number when the service option becomes  
35 active.
- 36 • If the order indicates a service option rejection, the base station shall set SO\_REQ to  
37 NULL. The base station shall continue to process primary traffic as it did prior to  
38 receiving the *Service Option Response Order* and shall remain in the current state.
- 39 • If the order does not indicate a service option rejection and the service option  
40 specified in the order is not equal to SO\_REQ, the base station shall set SO\_REQ to

1 NULL, should send a *Release Order* (ORDQ = '00000010), and should enter the  
2 *Release Substate*.

3 7.6.4.1.2.2.3 Processing the Received *Service Option Control Order*

4 If there is an active service option (SO\_CUR is not equal to NULL), the base station shall  
5 process the received *Service Option Control Order* in accordance with the requirements for  
6 the active service option.

7 7.6.4.1.2.2.4 Service Option Request Initialization

8 To perform service option request initialization, the base station shall set SO\_REQ to the  
9 specified service option number.

10 7.6.4.1.3 Acknowledgement Procedures

11 The acknowledgement procedures facilitate the reliable exchange of messages between the  
12 mobile station and the base station. The base station uses the fields ACK\_SEQ  
13 (acknowledgement sequence number), MSG\_SEQ (message sequence number), and  
14 ACK\_REQ (acknowledgement required) to detect duplicate messages and provide a reference  
15 for acknowledgements. These message fields are referred to as layer 2 fields, and the  
16 acknowledgement procedures are referred to as layer 2 procedures. All other message fields  
17 are referred to as layer 3 fields, and the processing of layer 3 fields is referred to as layer 3  
18 processing. (See Appendix C for further discussion of layering.)

19 On both the Reverse Traffic Channel and the Forward Traffic Channel, the procedure for  
20 messages requiring acknowledgement is a selective repeat scheme in which a message is  
21 retransmitted only if an acknowledgement for it is not received.

22 7.6.4.1.3.1 Messages Requiring Acknowledgement

23 A Traffic Channel message requires acknowledgement when the ACK\_REQ field is set to '1'.

24 7.6.4.1.3.1.1 Transmitting Messages and Receiving Acknowledgements

25 The Layer 2 protocol does not guarantee delivery of messages in any order. If the base  
26 station requires that the mobile station receive a set of messages in a certain order, the  
27 base station shall wait for an acknowledgement of each message before transmitting the  
28 next message in the set. For messages requiring acknowledgement whose relative ordering  
29 is not important, the base station may transmit up to four such messages before receiving  
30 an acknowledgement for the first message.

31 The base station shall store a message sequence number for messages requiring  
32 acknowledgement (MSG\_SEQ\_ACK). The base station shall store an acknowledgement  
33 status indicator for each possible value of the Forward Traffic Channel message MSG\_SEQ  
34 field (ACK\_WAITING[n], where n is 0 through 7). The base station shall not send a new  
35 message requiring acknowledgement when ACK\_WAITING[(MSG\_SEQ\_ACK + 4) modulo 8]  
36 is equal to YES.



1 The base station shall perform the following procedures:

- 2 • When the base station receives a message on the Reverse Traffic Channel, with  
3 acknowledgement sequence number ACK\_SEQ, it shall set ACK\_WAITING[ACK\_SEQ]  
4 to NO.
- 5 • When the base station sends a new message requiring acknowledgement on the  
6 Forward Traffic Channel, it shall set ACK\_WAITING[MSG\_SEQ\_ACK] to YES and shall  
7 set the MSG\_SEQ field of the message to MSG\_SEQ\_ACK. The base station shall  
8 then increment MSG\_SEQ\_ACK, modulo 8.

9 The base station shall not retransmit a message for which it has received an  
10 acknowledgement.

11 If the base station does not receive an acknowledgement after transmitting the message, the  
12 base station shall retransmit the message. If the base station retransmits a message, the  
13 base station shall use the same MSG\_SEQ number for the retransmission.

14 The base station shall store a retransmission counter (RETRY\_COUNT) for each transmitted  
15 message requiring acknowledgement. The base station shall set RETRY\_COUNT to zero  
16 prior to the first transmission of the message. After each transmission of the message, the  
17 base station shall increment RETRY\_COUNT if no acknowledgement is received. The base  
18 station shall not exceed a maximum number of retransmissions, to be selected by the base  
19 station manufacturer. When RETRY\_COUNT is equal to the maximum number of  
20 retransmissions, the base station shall declare an acknowledgement failure.

#### 21 7.6.4.1.3.1.2 Receiving Messages and Returning Acknowledgements

22 Messages received on the Reverse Traffic Channel contain MSG\_SEQ fields that are  
23 incremented using the same rules as messages transmitted on the Forward Traffic Channel.  
24 Separate sequence numbers are maintained for Reverse Traffic Channel Messages that  
25 require acknowledgement and for messages that do not require acknowledgement.

26 The base station acknowledges a received message by transmitting a message with the  
27 ACK\_SEQ field set equal to the MSG\_SEQ field of the received message. A message  
28 transmitted with the ACK\_SEQ field set in this manner is referred to as including an  
29 acknowledgement of the received message.

30 Whenever a message requiring acknowledgement is received, the base station shall set the  
31 ACK\_SEQ field of subsequent Forward Traffic Channel messages to the MSG\_SEQ field of  
32 the received message. If no message has been received, the base station shall set this field  
33 to '111'.

34 After receiving a message requiring acknowledgment, the base station shall send a message  
35 including an acknowledgment in accordance with the timing requirements specified in  
36 6.6.4.1.3.1.1. If the base station does not have a message in which to include the  
37 acknowledgment, the base station shall send a *Base Station Acknowledgment Order*.

38 When a received message requires acknowledgement and no message is available within  
39  $T_{1m}$  seconds after the message is received, the base station shall transmit a *Base Station*  
40 *Acknowledgment Order* including the acknowledgement.

1 For duplicate message detection, the base station shall store a received status indicator for  
 2 each possible value of the Reverse Traffic Channel message MSG\_SEQ field  
 3 [MSG\_SEQ\_RCVD]<sub>n</sub>, where n is 0 through 7). The base station shall perform the following  
 4 procedures:

- 5 • When a message requiring acknowledgement is received with message sequence  
 6 number MSG\_SEQ, and MSG\_SEQ\_RCVD[MSG\_SEQ] is equal to NO, the base  
 7 station shall process the message as a new message. The base station shall then set  
 8 MSG\_SEQ\_RCVD[MSG\_SEQ] to YES, and shall set MSG\_SEQ\_RCVD[(MSG\_SEQ +  
 9 4) modulo 8] to NO.
- 10 • When a message requiring acknowledgement is received with message sequence  
 11 number MSG\_SEQ, and MSG\_SEQ\_RCVD[MSG\_SEQ] is equal to YES, the base  
 12 station shall acknowledge the message but shall not perform any further processing  
 13 of the message.

#### 14 7.6.4.1.3.2 Messages not Requiring Acknowledgement

15 A Traffic Channel message does not require acknowledgement when the ACK\_REQ field is  
 16 set to '0'.

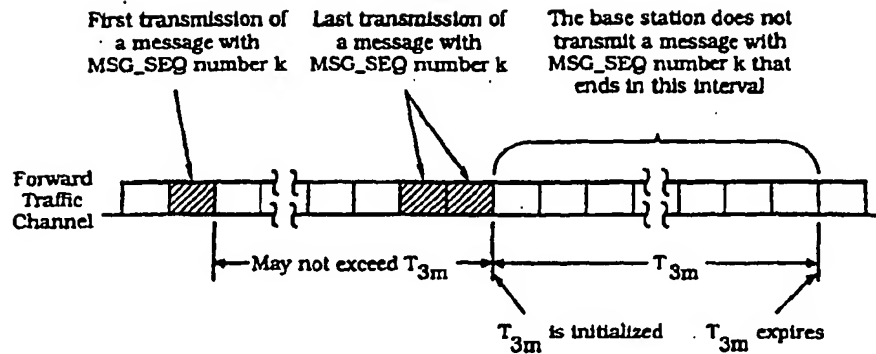
17 The base station shall store a message sequence number for messages not requiring  
 18 acknowledgement (MSG\_SEQ\_NOACK). For each new message sent that does not require  
 19 acknowledgement, the base station shall set the MSG\_SEQ field of the message to  
 20 MSG\_SEQ\_NOACK and shall then increment MSG\_SEQ\_NOACK, modulo 8.

21 If the base station transmits the same message not requiring acknowledgement more than  
 22 once, it shall use the same MSG\_SEQ number for all transmissions. The base station shall  
 23 complete all retransmissions of the same message within  $T_{3m}$  seconds after the first  
 24 transmission, as shown in Figure 7.6.4.1.3.2-1. The base station shall wait at least  $T_{3m}$   
 25 seconds after the last transmission of a message not requiring acknowledgement before  
 26 transmitting another message not requiring acknowledgement that has the same MSG\_SEQ  
 27 number, as shown in Figure 7.6.4.1.3.2-1.<sup>13</sup>

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<sup>13</sup>This is necessary because it is possible that the mobile station receives only the last transmission.



**Figure 7.6.4.1.3.2-1. Time Requirement for the Base Station Not to Reuse a MSG\_SEQ Number**

#### 7.6.4.1.3.3 Acknowledgement Procedures Reset

The base station shall reset the acknowledgement procedures as follows:

- Message sequence number reset.
  - If ACK\_WAITING[n] is equal to YES for any n, the base station should save the corresponding messages and retransmit them after completing the reset of the acknowledgement procedures. For each such message, the base station shall set the retransmission counter (RETRY\_COUNT) to zero.
  - The base station shall set both MSG\_SEQ\_ACK and MSG\_SEQ\_NOACK to 0, and shall set ACK\_WAITING[n] to NO for all values of n from 0 to 7.
- Acknowledgement sequence number reset. The base station shall set the ACK\_SEQ field of all Forward Traffic Channel messages to '111' until the first message requiring acknowledgement is received.
- Duplicate detection reset. The base station shall set MSG\_SEQ\_RCVD[n] to NO for all values of n from 0 to 7.

## 7.6.4.1.4 Message Action Times

A Forward Traffic Channel message without a *USE\_TIME* field or with a *USE\_TIME* field set to '0' has an implicit action time. A message with its *USE\_TIME* field set to '1' has an explicit action time which is specified in the *ACTION\_TIME* field of the message. A message with an explicit action time is called a pending message.

Unless otherwise specified, a message having an implicit action time shall take effect no later than the first 80 ms boundary (relative to System Time) occurring at least 80 ms after the end of the frame containing the last bit of the message. A message with an explicit action time shall take effect when System Time (in 80 ms units) modulo 64 becomes equal to the message's *ACTION\_TIME* field. The difference in time between *ACTION\_TIME* and the end of the frame containing the last bit of the message shall be at least 80 ms.

The base station shall support one pending message at any given time, not including pending *Service Option Control Orders*. The number of pending *Service Option Control Orders* that the base station is required to support is specific to the service option (see the relevant service option descriptions).

## 7.6.4.1.5 Long Code Transition Request Processing

If a request for voice privacy is specified in the *Origination Message* or *Page Response Message*, the base station may send a *Long Code Transition Request Order* (ORDQ = '00000001') requesting a transition to the private long code.

The base station shall process the *Long Code Transition Request Order* as follows:

- If the *Long Code Transition Request Order* requests a transition to the private long code and the base station accepts the request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000001'). If the base station does not accept the private long code transition request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000000').
- If the *Long Code Transition Request Order* requests a transition to the public long code and the base station accepts the request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000000'). If the base station does not accept the public long code transition request, the base station shall send a *Long Code Transition Request Order* (ORDQ = '00000001').

The base station shall process the *Long Code Transition Response Order* as follows:

- If the *Long Code Transition Response Order* indicates that the mobile station accepts the long code transition requested in the *Long Code Transition Request Order* sent by the base station, the base station shall use the requested long code mask on both the Forward Traffic Channel and the Reverse Traffic Channel. The base station shall specify an explicit action time in the *Long Code Transition Request Order*. The base station shall begin using the requested long code mask using the explicit action time (see 7.6.4.1.4).

#### 7.6.4.2 Traffic Channel Initialization Substate

In this substate, the base station begins transmitting on the Forward Traffic Channel and acquires the Reverse Traffic Channel.

Upon entering the *Traffic Channel Initialization Substate*, the base station shall perform the following:

- The base station shall reset the message acknowledgement procedures as specified in 7.6.4.1.3.3.
- The base station shall set SO\_CUR to NULL to indicate that there is no active service option.
- The base station shall perform service option request initialization (see 7.6.4.1.2.2.4) specifying NULL as the service option number.
- The base station shall set its Forward and Reverse Traffic Channel long code masks to the public long code mask (see 7.1.3.5.6).
- The base station shall set its Forward and Reverse Traffic Channel frame offsets (see 7.1.3.5.1) to the frame offset assigned to the mobile station.

While in the *Traffic Channel Initialization Substate*, the base station shall perform the following:

- The base station shall transmit null Traffic Channel data.
- The base station shall perform the message acknowledgement procedures as specified in 7.6.4.1.3.
- If the base station acquires the Reverse Traffic Channel, the base station shall send a *Base Station Acknowledgement Order*. The base station should send the *Base Station Acknowledgement Order* as a message requiring acknowledgement. If the call is a mobile station terminated call, the base station shall enter the *Waiting for Order Substate* (see 7.6.4.3.1). If the call is a mobile station originated call, the base station shall enter the *Conversation Substate* (see 7.6.4.4).
- If the base station fails to acquire the Reverse Traffic Channel, the base station shall either retransmit the *Channel Assignment Message* on the Paging Channel and remain in the *Traffic Channel Initialization Substate*, or the base station should disable transmission on the Forward Traffic Channel and discontinue the *Traffic Channel Processing* for the mobile station.

## 1 7.6.4.3 Alerting

## 2 7.6.4.3.1 Waiting for Order Substate

3 In this substate, the base station sends an *Alert With Information Message* to the mobile  
4 station.

5 Upon entering the *Waiting for Order Substate*, the base station shall perform the following:

- 6 • The base station shall process the service option request specified in the *Page*  
7 *Response Message* as specified in 7.6.4.1.2.2.1.

8 While in the *Waiting for Order Substate*, the base station shall perform the following:

- 9 • The base station shall transmit the power control subchannel as specified in  
10 7.1.3.1.7.
- 11 • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
12 shall process the received primary traffic bits in accordance with the requirements for  
13 the active service option; otherwise, the base station shall discard the received  
14 primary traffic bits.
- 15 • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
16 shall transmit primary traffic bits in accordance with the requirements for the active  
17 service option; otherwise, the base station shall transmit null Traffic Channel data.
- 18 • The base station shall perform the message acknowledgement procedures as  
19 specified in 7.6.4.1.3.
- 20 • If the base station declares a loss of Reverse Traffic Channel continuity (see 7.4.2),  
21 the base station should send a *Release Order* to the mobile station. If the base  
22 station sends a *Release Order*, the base station shall enter the *Release Substate*.
- 23 • The base station may perform Forward Traffic Channel power control as specified in  
24 7.6.4.1.1.
- 25 • The base station may request a service option as specified in 7.6.4.1.2. To do so, the  
26 base station shall perform service option request initialization (see 7.6.4.1.2.2.4)  
27 specifying the requested service option number, and shall send a *Service Option*  
28 *Request Order* (ORDQ = requested service option number).
- 29 • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
30 may send a *Service Option Control Order* (ORDQ = function code) to invoke a service  
31 option specific function in accordance with the requirements for the active service  
32 option.
- 33 • The base station may request a long code transition, as specified in 7.6.4.1.5, either  
34 autonomously or in response to a request for voice privacy specified in the *Origination*  
35 *Message* or *Page Response Message*.
- The base station may perform authentication procedures as specified in 7.3.1.

- 1 • The base station may send the following messages. If the base station sends a  
2 message, the base station shall comply with the specified requirements for sending  
3 the message, if any.
- 4 1. Alert With Information Message: The base station shall enter the *Waiting for*  
5 *Answer Substate*.
- 6 2. Analog Handoff Direction Message: The base station shall enter the *Waiting for*  
7 *Order Task* (see 3.6.4.3.1 for handoff to a wide analog channel and 3.6.5.3.1A of  
8 IS-91 for handoff to a narrow analog channel).
- 9 3. Audit Order
- 10 4. Authentication Challenge Message
- 11 5. Base Station Acknowledgement Order
- 12 6. Base Station Challenge Confirmation Order
- 13 7. Data Burst Message
- 14 8. Extended Handoff Direction Message
- 15 9. Handoff Direction Message
- 16 10. In-Traffic System Parameters Message
- 17 11. Local Control Order
- 18 12. Lock Until Power-Cycled Order
- 19 13. Long Code Transition Request Order
- 20 14. Maintenance Order: The base station shall enter the *Waiting for Answer*  
21 *Substate*.
- 22 15. Maintenance Required Order
- 23 16. Message Encryption Mode Order
- 24 17. Mobile Station Registered Message
- 25 18. Neighbor List Update Message
- 26 19. Parameter Update Order: (see 2.3.12.1.3).
- 27 20. Pilot Measurement Request Order
- 28 21. Power Control Parameters Message
- 29 22. Release Order: The base station shall enter the *Release Substate*.
- 30 23. Retrieve Parameters Message
- 31 24. Service Option Control Order
- 32 25. Service Option Request Order
- 33 26. Service Option Response Order
- 34 27. Set Parameters Message

1     28. SSD Update Message2     29. Status Request Order

- 3     • If the base station receives one of the following messages from the mobile station, the  
4     base station shall process the message according to the specified requirements, if  
5     any:

6     1. Base Station Challenge Order: The base station shall process the message as  
7     described in 6.3.12.1.9.

8     2. Data Burst Message

9     3. Handoff Completion Message: The base station shall process the message as  
10     described in 7.6.6.2.2.3.

11    4. Long Code Transition Request Order: The base station shall process the message  
12    as described in 7.6.4.1.5.

13    5. Mobile Station Acknowledgment Order

14    6. Mobile Station Reject Order

15    7. Parameters Response Message

16    8. Parameter Update Confirmation Order

17    9. Pilot Strength Measurement Message: The base station shall process the  
18    message as described in 7.6.6.2.2.1.

19    10. Power Measurement Report Message: The base station may process the message  
20    as described in 7.6.4.1.1.

21    11. Release Order: The base station shall send the mobile station a *Release Order*,  
22    within  $T_{2b}$  seconds, and enter the *Release Substate*, or the base station shall  
23    send an *Alert with Information Message*, within  $T_{2b}$  seconds, and enter the  
24    *Waiting for Answer Substate*.

25    12. Request Analog Service Order: The base station may respond with an *Analog*  
26    *Handoff Direction Message*.

27    13. Request Narrow Analog Service Order: The base station may respond with an  
28    *Analog Handoff Direction Message*.

29    14. Request Wide Analog Service Order: The base station may respond with an  
30    *Analog Handoff Direction Message*.

31    15. SSD Update Confirmation Order

32    16. SSD Update Rejection Order

33    17. Service Option Control Order: The base station shall process the message as  
34    described in 7.6.4.1.2.2.3.

35    18. Service Option Request Order: The base station shall process the message as  
36    described in 7.6.4.1.2.2.1.



1       19. Service Option Response Order: The base station shall process the message as  
2       described in 7.6.4.1.2.2.2.

3       20. Status Response Order

4       7.6.4.3.2 Waiting for Answer Substate

5       In this substate, the base station waits for a *Connect Order* from the mobile station.

6       While in the *Waiting for Answer Substate*, the base station shall perform the following:

- 7       • The base station shall transmit the power control subchannel as specified in  
8       7.1.3.1.7.
- 9       • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
10       shall process the received primary traffic bits in accordance with the requirements for  
11       the active service option; otherwise, the base station shall discard the received  
12       primary traffic bits.
- 13       • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
14       shall transmit primary traffic bits in accordance with the requirements for the active  
15       service option; otherwise, the base station shall transmit null Traffic Channel data.
- 16       • The base station shall perform the message acknowledgement procedures as  
17       specified in 7.6.4.1.3.
- 18       • If the base station declares a loss of Reverse Traffic Channel continuity (see 7.4.2),  
19       the base station should send a *Release Order* to the mobile station. If the base  
20       station sends a *Release Order*, the base station shall enter the *Release Substate*.
- 21       • The base station may perform Forward Traffic Channel power control as specified in  
22       7.6.4.1.1.
- 23       • The base station may request a service option as specified in 7.6.4.1.2. To do so, the  
24       base station shall perform service option request initialization (see 7.6.4.1.2.2.4)  
25       specifying the requested service option number, and shall send a *Service Option*  
26       *Request Order* (ORDQ = requested service option number).
- 27       • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
28       may send a *Service Option Control Order* (ORDQ = function code) to invoke a service  
29       option specific function in accordance with the requirements for the active service  
30       option.
- 31       • The base station may request a long code transition, as specified in 7.6.4.1.5, either  
32       autonomously or in response to a request for voice privacy specified in the *Origination*  
33       *Message* or *Page Response Message*.
- 34       • The base station may perform authentication procedures as specified in 7.3.1.
- 35       • The base station may send the following messages. If the base station sends a  
36       message, the base station shall comply with the specified requirements for sending  
37       the message, if any.

38       1. Alert With Information Message

- 1        2. Analog Handoff Direction Message: The base station shall enter the Waiting for  
2        Answer Task (see 3.6.4.3.2 for handoff to a wide analog channel and 3.6.5.3.2 of  
3        IS-91 for handoff to a narrow analog channel).
- 4        3. Audit Order
- 5        4. Authentication Challenge Message
- 6        5. Base Station Acknowledgement Order
- 7        6. Base Station Challenge Confirmation Order
- 8        7. Data Burst Message
- 9        8. Extended Handoff Direction Message
- 10       9. Handoff Direction Message
- 11       10. In-Traffic System Parameters Message
- 12       11. Local Control Order
- 13       12. Lock Until Power-Cycled Order
- 14       13. Long Code Transition Request Order
- 15       14. Maintenance Order
- 16       15. Maintenance Required Order
- 17       16. Message Encryption Mode Order
- 18       17. Mobile Station Registered Message
- 19       18. Neighbor List Update Message
- 20       19. Parameter Update Order: (see 2.3.12.1.3).
- 21       20. Pilot Measurement Request Order
- 22       21. Power Control Parameters Message
- 23       22. Release Order: The base station shall enter the Release Substate.
- 24       23. Retrieve Parameters Message
- 25       24. Service Option Control Order
- 26       25. Service Option Request Order
- 27       26. Service Option Response Order
- 28       27. Set Parameters Message
- 29       28. SSD Update Message
- 30       29. Status Request Order
- 31       • If the base station receives one of the following messages from the mobile station, the  
32       base station shall process the message according to the specified requirements, if  
33       any:

1. Base Station Challenge Order: The base station shall process the message as described in 6.3.12.1.9.
2. Connect Order: The base station shall enter the *Conversation Substate*.
3. Data Burst Message
4. Handoff Completion Message: The base station shall process the message as described in 7.6.6.2.2.3.
5. Long Code Transition Request Order: The base station shall process the message as described in 7.6.4.1.5.
6. Mobile Station Acknowledgement Order
7. Mobile Station Reject Order
8. Parameters Response Message
9. Parameter Update Confirmation Order
10. Pilot Strength Measurement Message: The base station shall process the message as described in 7.6.6.2.2.1.
11. Power Measurement Report Message: The base station may process the message as described in 7.6.4.1.1.
12. Release Order: The base station shall send the mobile station a *Release Order*, within  $T_{2b}$  seconds, and enter the *Release Substate*, or the base station shall send an *Alert with Information Message*, within  $T_{2b}$  seconds, and enter the *Waiting for Answer Substate*.
13. Request Analog Service Order: The base station may respond with an *Analog Handoff Direction Message*.
14. Request Narrow Analog Service Order: The base station may respond with an *Analog Handoff Direction Message*.
15. Request Wide Analog Service Order: The base station may respond with an *Analog Handoff Direction Message*.
16. SSD Update Confirmation Order
17. SSD Update Rejection Order
18. Service Option Control Order: The base station shall process the message as described in 7.6.4.1.2.2.3.
19. Service Option Request Order: The base station shall process the message as described in 7.6.4.1.2.2.1.
20. Service Option Response Order: The base station shall process the message as described in 7.6.4.1.2.2.2.
21. Status Response Order

1   7.6.4.4 Conversation Substate

2   In this substate, the base station exchanges primary traffic bits with the mobile station's  
3   primary traffic service option application.

4   Upon entering the *Conversation Substate*, the base station shall perform the following:

- 5       • If the call is mobile station originated, the base station shall process the service  
6       option request specified in the *Origination Message* as specified in 7.6.4.1.2.2.1.

7   While in the *Conversation Substate*, the base station shall perform the following:

- 8       • The base station shall transmit the power control subchannel as specified in  
9       7.1.3.1.7.
- 10      • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
11      shall process the received primary traffic bits in accordance with the requirements for  
12      the active service option; otherwise, the base station shall discard the received  
13      primary traffic bits.
- 14      • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
15      shall transmit primary traffic bits in accordance with the requirements for the active  
16      service option; otherwise, the base station shall transmit null Traffic Channel data.
- 17      • The base station shall perform the message acknowledgement procedures as  
18      specified in 7.6.4.1.3.
- 19      • If the base station declares a loss of Reverse Traffic Channel continuity (see 7.4.2),  
20      the base station should send a *Release Order* to the mobile station. If the base  
21      station sends a *Release Order*, the base station shall enter the *Release Substate*.
- 22      • The base station may perform Forward Traffic Channel power control as specified in  
23      7.6.4.1.1.
- 24      • The base station may request a service option as specified in 7.6.4.1.2. To do so, the  
25      base station shall perform service option request initialization (see 7.6.4.1.2.2.4)  
26      specifying the requested service option number, and shall send a *Service Option*  
27      *Request Order* (ORDQ = requested service option number).
- 28      • If there is an active service option (SO\_CUR is not equal to NULL), the base station  
29      may send a *Service Option Control Order* (ORDQ = function code) to invoke a service  
30      option specific function in accordance with the requirements for the active service  
31      option.
- 32      • The base station may request a long code transition, as specified in 7.6.4.1.5, either  
33      autonomously or in response to a request for voice privacy specified in the *Origination*  
34      *Message* or *Page Response Message*.
- 35      • The base station may perform authentication procedures as specified in 7.3.1.
- 36      • The base station may send the following messages. If the base station sends a  
37      message, the base station shall comply with the specified requirements for sending  
38      the message, if any.

1. Alert With Information Message: If the message contains a signal information record with the SIGNAL\_TYPE field set to '01' or '10', or if the message does not contain a signal information record, the base station shall enter the *Waiting for Answer Substate*.
2. Analog Handoff Direction Message: The base station shall enter the Conversation Task (see 3.6.4.4 for handoff to a wide analog channel and 3.6.5.4A of IS-91 for handoff to a narrow analog channel).
3. Audit Order
4. Authentication Challenge Message
5. Base Station Acknowledgement Order
6. Base Station Challenge Confirmation Order
7. Continuous DTMF Tone Order
8. Data Burst Message
9. Extended Handoff Direction Message
10. Flash With Information Message
11. Handoff Direction Message
12. In-Traffic System Parameters Message
13. Local Control Order
14. Lock Until Power-Cycled Order
15. Long Code Transition Request Order
16. Maintenance Order: The base station shall enter the *Waiting for Answer Substate*.
17. Maintenance Required Order
18. Message Encryption Mode Order
19. Mobile Station Registered Message
20. Neighbor List Update Message
21. Parameter Update Order: (see 2.3.12.1.3).
22. Pilot Measurement Request Order
23. Power Control Parameters Message
24. Release Order: The base station shall enter the *Release Substate*.
25. Retrieve Parameters Message
26. Send Burst DTMF Message
27. Service Option Control Order
28. Service Option Request Order

1       29. Service Option Response Order

2       30. Set Parameters Message

3       31. SSD Update Message

4       32. Status Request Order

- 5       • If the base station receives one of the following messages from the mobile station, the  
6       base station shall process the message according to the specified requirements, if  
7       any:

8       1. Base Station Challenge Order: The base station shall process the message as  
9       described in 6.3.12.1.9.

10      2. Continuous DTMF Tone Order

11      3. Data Burst Message

12      4. Flash With Information Message

13      5. Handoff Completion Message: The base station shall process the message as  
14      described in 7.6.6.2.2.3.

15      6. Long Code Transition Request Order: The base station shall process the message  
16      as described in 7.6.4.1.5.

17      7. Mobile Station Acknowledgment Order

18      8. Mobile Station Reject Order

19      9. Origination Continuation Message

20      10. Parameters Response Message

21      11. Parameter Update Confirmation Order

22      12. Pilot Strength Measurement Message: The base station shall process the  
23      message as described in 7.6.6.2.2.1.

24      13. Power Measurement Report Message: The base station may process the message  
25      as described in 7.6.4.1.1.

26      14. Release Order: The base station shall send the mobile station a *Release Order*,  
27      within  $T_{2b}$  seconds, and enter the *Release Substate*, or the base station shall  
28      send an *Alert with Information Message*, within  $T_{2b}$  seconds, and enter the  
29      *Waiting for Answer Substate*.

30      15. Request Analog Service Order: The base station may respond with an *Analog*  
31      *Handoff Direction Message*.

32      16. Request Narrow Analog Service Order: The base station may respond with an  
33      *Analog Handoff Direction Message*.

34      17. Request Wide Analog Service Order: The base station may respond with an  
35      *Analog Handoff Direction Message*.

36      18. SSD Update Confirmation Order

1       19. SSD Update Rejection Order

2       20. Send Burst DTMF Message

3       21. Service Option Control Order: The base station shall process the message as  
4       described in 7.6.4.1.2.2.3.

5       22. Service Option Request Order: The base station shall process the message as  
6       described in 7.6.4.1.2.2.1.

7       23. Service Option Response Order: The base station shall process the message as  
8       described in 7.6.4.1.2.2.2.

9       24. Status Response Order

10      7.6.4.5 Release Substate

11      In this substate, the base station disconnects the call.

12      While in the *Release Substate*, the base station shall perform the following:

- 13       • The base station shall transmit the power control subchannel as specified in  
14       7.1.3.1.7.
- 15       • The base station shall transmit null Traffic Channel data for at least  $T_{3b}$  seconds.  
16       After this interval, the base station should stop transmitting on the Forward Traffic  
17       Channel.
- 18       • The base station shall perform the message acknowledgement procedures as  
19       specified in 7.6.4.1.3.
- 20       • The base station may perform Forward Traffic Channel power control as specified in  
21       7.6.4.1.1.
- 22       • The base station may send the following messages. If the base station sends a  
23       message, the base station shall comply with the specified requirements for sending  
24       the message, if any.
  - 25          1. Alert With Information Message: If the message contains a signal information  
26          record with the SIGNAL\_TYPE field set to '01' or '10', or if the message does not  
27          contain a signal information record, the base station shall enter the *Waiting for*  
28          *Answer Substate*.
  - 29          2. Audit Order
  - 30          3. Base Station Acknowledgement Order
  - 31          4. Data Burst Message
  - 32          5. Extended Handoff Direction Message
  - 33          6. Handoff Direction Message
  - 34          7. In-Traffic System Parameters Message
  - 35          8. Local Control Order
  - 36          9. Lock Until Power-Cycled Order

- 1        10. Maintenance Order: The base station shall enter the *Waiting for Answer*
- 2        *Substate*.
- 3        11. Maintenance Required Order
- 4        12. Mobile Station Registered Message
- 5        13. Neighbor List Update Message
- 6        14. Parameter Update Order: (see 2.3.12.1.3).
- 7        15. Power Control Parameters Message
- 8        16. Release Order
- 9        17. Retrieve Parameters Message
- 10       18. Service Option Control Order
- 11       19. Status Request Order
- 12       • If the base station receives one of the following messages from the mobile station, the
- 13       base station shall process the message according to the specified requirements, if
- 14       any:
- 15       1. Base Station Challenge Order: The base station shall process the message as
- 16       described in 6.3.12.1.9.
- 17       2. Connect Order
- 18       3. Continuous DTMF Tone Order
- 19       4. Data Burst Message
- 20       5. Flash With Information Message
- 21       6. Handoff Completion Message: The base station shall process the message as
- 22       described in 7.6.6.2.2.3.
- 23       7. Long Code Transition Request Order
- 24       8. Mobile Station Acknowledgment Order
- 25       9. Mobile Station Reject Order
- 26       10. Origination Continuation Message
- 27       11. Parameter Update Confirmation Order
- 28       12. Parameters Response Message
- 29       13. Pilot Strength Measurement Message
- 30       14. Power Measurement Report Message
- 31       15. Release Order
- 32       16. Request Analog Service Order
- 33       17. Request Narrow Analog Service Order
- 34       18. Request Wide Analog Service Order



- 1        19. SSD Update Confirmation Order
- 2        20. SSD Update Rejection Order
- 3        21. Send Burst DTMF Message
- 4        22. Service Option Control Order
- 5        23. Service Option Request Order
- 6        24. Service Option Response Order
- 7        25. Status Response Order

#### 8        7.6.5 Registration

9        Registration is the process by which a mobile station notifies the base station of its location,  
10       status, identification, slot cycle, and other characteristics. The base station can make use  
11       of location information to efficiently page the mobile station when establishing a mobile-  
12       terminated call. Registration also provides the mobile station's SLOT\_CYCLE\_INDEX  
13       parameter so that the base station can determine which Paging Channel slots a mobile  
14       station operating in the slotted mode is monitoring. Registration also provides the station  
15       class mark and protocol revision number so that the base station knows the capabilities of  
16       the mobile station.

17       The CDMA system supports nine different forms of registration:

- 18       1. Power-up registration. The mobile station registers when it powers on or switches  
19       from using the analog system.
- 20       2. Power-down registration. The mobile station registers when it powers off if  
21       previously registered in the current serving system.
- 22       3. Timer-based registration. The mobile station registers when a timer expires.
- 23       4. Distance-based registration. The mobile station registers when the distance  
24       between the current base station and the base station in which it last registered  
25       exceeds a threshold.
- 26       5. Zone-based registration. The mobile station registers when it enters a new zone.
- 27       6. Parameter-change registration. The mobile station registers when certain of its  
28       stored parameters change or when it enters a new system.
- 29       7. Ordered registration. The mobile station registers when the base station requests  
30       it.
- 31       8. Implicit registration. When a mobile station successfully sends an *Origination*  
32       *Message* or *Page Response Message*, the base station can infer the mobile station's  
33       location. This is considered an implicit registration.
- 34       9. Traffic Channel registration. Whenever the base station has registration  
35       information for a mobile station that has been assigned to a Traffic Channel, the  
36       base station can notify the mobile station that it is registered.

1 The first five forms of registration, as a group, are called autonomous registration and are  
2 conditioned, in part, by roaming status and by indicators contained in the *System*  
3 *Parameters Message* (see 6.6.5.3). The base station may initiate ordered registration  
4 through an *Order Message*.

5 While a mobile station is assigned a Traffic Channel, the base station may obtain  
6 registration information by using the *Status Request Order* to obtain *Status Messages* from  
7 the mobile station. The base station may notify the mobile station that it is registered  
8 through the *Mobile Station Registered Message*.

#### 9 7.6.5.1 Registration on the Paging and Access Channels

10 The base station shall specify the forms of registration that are enabled, the corresponding  
11 registration parameters, and the roaming status conditions for which registration is  
12 enabled in the *System Parameters Message*. If any of the autonomous registration forms  
13 are enabled, the base station should also enable parameter-based registration.

14 The base station should process an *Origination Message* or *Page Response Message* sent on  
15 the Access Channel as an implicit registration of the mobile station sending the message.  
16 The base station can obtain complete registration information about the mobile station at  
17 any time by sending a *Registration Request Order* to the mobile station.

#### 18 7.6.5.2 Registration on the Traffic Channels

19 The base station can obtain registration information from a mobile station on the traffic  
20 channel by means of the *Status Request Order*. When the base station has registration data  
21 for a mobile station, the base station may send a *Mobile Station Registered Message* to the  
22 mobile station, specifying the base station's registration system, zone and location  
23 information.

### 24 7.6.6 Handoff Procedures

#### 25 7.6.6.1 Overview

##### 26 7.6.6.1.1 Types of Handoff

27 The base station supports the following three handoff procedures:

- 28 • *Soft Handoff*: A handoff in which a new base station commences communications  
29 with the mobile station without interrupting the communications with the old base  
30 station. The base station<sup>14</sup> can direct the mobile station to perform a soft handoff  
31 only when all Forward Traffic Channels assigned to the mobile station have identical  
32 frequency assignments and frame offsets. Soft handoff provides diversity of Forward  
33 Traffic Channels and Reverse Traffic Channel paths on the boundaries between base  
34 stations.

---

<sup>14</sup>In this section the term base station may imply multiple cells or sectors.

- 1 • *CDMA to CDMA Hard Handoff*: A handoff in which the base station directs the mobile  
2 station to transition between disjoint sets of base stations, different frequency  
3 assignments, or different frame offsets.

- 4 • *CDMA to Analog Handoff*: A handoff in which the base station directs the mobile  
5 station from a Forward Traffic Channel to an analog voice channel.

6 Section 6.6.6 describes the mobile station requirements during handoff.

#### 7 7.6.6.1.2 The Active Set

8 The Active Set contains the pilots (see 6.6.6.1.2) associated with the Forward Traffic  
9 Channels assigned to the mobile station. Initially the base station informs the mobile  
10 station of the contents of the Active Set using the *Channel Assignment Message*;  
11 subsequent changes to the contents of the Active Set are provided using the *Extended*  
12 *Handoff Direction Message* or the *Handoff Direction Message*.

#### 13 7.6.6.2 Requirements

##### 14 7.6.6.2.1 Overhead Information

15 The base station sends the following messages governing the pilot search procedures  
16 performed by the mobile station:

- 17 • *System Parameters Message*
- 18 • *In-Traffic System Parameters Message*
- 19 • *Neighbor List Message*
- 20 • *Neighbor List Update Message*
- 21 • *Handoff Direction Message*
- 22 • *Extended Handoff Direction Message*

##### 23 7.6.6.2.1.1 System Parameters

24 The base station sends handoff related parameters on the Paging Channel in the *System*  
25 *Parameters Message*.

26 The base station may revise handoff related parameters for a mobile station operating on  
27 the Traffic Channel by sending the *In-Traffic System Parameters Message*.

28 The base station may also modify the values of the parameters SRCH\_WIN\_A, T\_ADD,  
29 T\_DROP, T\_COMP, and T\_TDROD through the *Extended Handoff Direction Message* or  
30 *Handoff Direction Message*.

##### 31 7.6.6.2.1.2 Neighbor List

32 The base station sends a Neighbor List on the Paging Channel, in the *Neighbor List*  
33 *Message*.

34 The base station may revise the Neighbor List for a mobile station operating on the Traffic  
35 Channel by sending a *Neighbor List Update Message*.

1 The base station shall not include a pilot that is a member of the mobile station's Active Set  
2 in a *Neighbor List Update Message*. The base station shall not specify more than  $N_{8m}$  pilots  
3 in the *Neighbor List Message* or in the *Neighbor List Update Message*. The base station  
4 should list the pilots in the *Neighbor List Update Message* in descending priority order (see  
5 6.6.6.2.6.3).

6 7.6.6.2.2 Call Processing During Handoff

7 7.6.6.2.2.1 Processing the *Pilot Strength Measurement Message*

8 The base station should use the pilot strength measurements in the *Pilot Strength*  
9 *Measurement Message* to determine a new Active Set.

10 The base station may also use the PN phase measurements in the *Pilot Strength*  
11 *Measurement Message* to estimate the propagation delay to the mobile station. This  
12 estimate can be used to reduce Reverse Traffic Channel acquisition time.

13 The base station may respond to a *Pilot Strength Measurement Message* received from the  
14 mobile station by sending the *Extended Handoff Direction Message* or *Handoff Direction*  
15 *Message*.

16 7.6.6.2.2.2 Processing the *Extended Handoff Direction Message* or the *Handoff Direction*  
17 *Message*

18 The base station shall maintain a *Extended Handoff Direction Message* or *Handoff Direction*  
19 *Message* sequence number. The sequence number shall be initialized to zero prior to the  
20 transmission of the first *Extended Handoff Direction Message* or *Handoff Direction Message*  
21 to the mobile station. The base station shall increment the sequence number modulo 4  
22 each time the base station modifies the pilot list (including the order in which pilots are  
23 specified within the list) sent to the mobile station in an *Extended Handoff Direction*  
24 *Message* or *Handoff Direction Message*.

25 Following a hard handoff, the base station should set the *Extended Handoff Direction*  
26 *Message* or *Handoff Direction Message* sequence number to the value of the  
27 LAST\_HDM\_SEQ field of the *Handoff Completion Message* and should use the pilot order  
28 contained in the *Handoff Completion Message* to interpret the contents of subsequent *Power*  
29 *Measurement Report Messages*.

30 The base station shall set the contents of an *Extended Handoff Direction Message* or  
31 *Handoff Direction Message* according to the following rules:

- 32 • An *Extended Handoff Direction Message* or *Handoff Direction Message* shall list no  
33 more than  $N_{8m}$  pilots in the new Active Set.
- 34 • An *Extended Handoff Direction Message* or *Handoff Direction Message* shall identify  
35 the identical power control subchannels (i.e., those carrying identical power control  
36 symbols).
- 37 • An *Extended Handoff Direction Message* or *Handoff Direction Message* may change  
38 the code channel associated with an Active Set pilot that remains in the new Active  
39 Set.

- 1 • The base station specifies the long code mask to be used on the new Forward Traffic  
2 Channel by using the PRIVATE\_LCM field of the *Extended Handoff Direction Message*  
3 or *Handoff Direction Message*. The base station may change the contents of this field  
4 only for CDMA to CDMA hard handoffs. If a change of long code mask is specified  
5 and the base station does not specify an explicit action time in the *Extended Handoff*  
6 *Direction Message* or *Handoff Direction Message*, the base station shall begin using  
7 the new long code mask on the first 80 ms boundary (relative to System Time)  
8 occurring at least 80 ms after the end of the frame containing the last bit of the  
9 message.
- 10 • For CDMA to CDMA hard handoffs, the base station may require the mobile station  
11 to perform a reset of the acknowledgement procedures by using the RESET\_L2 field  
12 of the *Extended Handoff Direction Message* or *Handoff Direction Message*. If the base  
13 station requires the mobile station to reset the acknowledgement procedures, the  
14 base station shall also reset the acknowledgement procedures, as specified in  
15 7.6.4.1.3.3. The acknowledgment procedures shall be reset immediately after the  
16 action time of the *Extended Handoff Direction Message* or *Handoff Direction Message*.
- 17 • For CDMA to CDMA hard handoffs, the base station may alter the frame offset by  
18 setting the FRAME\_OFFSET field to a new value. If the base station specifies a new  
19 frame offset and does not specify an explicit action time, the base station shall  
20 change its Forward and Reverse Traffic Channel frame offsets at the second 80 ms  
21 boundary (relative to System Time) after the end of transmission of the *Extended*  
22 *Handoff Direction Message* or *Handoff Direction Message*, unless the end of  
23 transmission of the message coincides with an 80 ms boundary, in which case the  
24 change in frame offsets shall occur 80 ms after the end of transmission.
- 25 • If the base station sends the *Extended Handoff Direction Message* or *Handoff Direction*  
26 *Message* as a message requiring acknowledgment (see 7.6.4.1.3.1), the base station  
27 should set the action time of the message such that there is sufficient time for the  
28 mobile station to transmit a message containing acknowledgment prior to the action  
29 time.

#### 30 7.6.6.2.2.3 Transmitting During Handoff

31 The base station shall continue transmission to the mobile station on a Forward Traffic  
32 Channel removed from the Active Set until it receives the *Handoff Completion Message* from  
33 the mobile station or determines that the call has been released.

34 The base station shall discontinue transmission to the mobile station on a Forward Traffic  
35 Channel removed from the Active Set after it receives the *Handoff Completion Message*.

#### 36 7.6.6.2.2.4 Ordering Pilot Measurements From the Mobile Station

37 The base station may direct the mobile station to send a *Pilot Strength Measurement*  
38 *Message* by sending a *Pilot Measurement Request Order*.

#### 7.6.6.2.3 Active Set Maintenance

The base station shall maintain an Active Set for each mobile station under its control as follows:

- When the base station sends the *Channel Assignment Message* it shall initialize the Active Set to contain only the pilot associated with the assigned Forward Traffic Channel.
- When the base station sends an *Extended Handoff Direction Message* or *Handoff Direction Message*, it shall add to the Active Set, before the action time of the message, all pilots included in the message, if they are not already in the Active Set.
- The base station shall delete the pilots that were not included in the most recent *Extended Handoff Direction Message* or *Handoff Direction Message* from the Active Set upon receipt of the *Handoff Completion Message*.

#### 7.6.6.2.4 Soft Handoff

The base station should use soft handoff when directing a mobile station from one Forward Traffic Channel to another Forward Traffic Channel having the same frequency assignment.

##### 7.6.6.2.4.1 Receiving During Soft Handoff

Each base station in the Active Set shall demodulate the Reverse Traffic Channel. The base station should provide diversity combining of the demodulated signals obtained by each base station in the Active Set.

##### 7.6.6.2.4.2 Transmitting During Soft Handoff

The base station shall begin transmitting identical modulation symbols on all Forward Traffic Channels specified in an *Extended Handoff Direction Message* or *Handoff Direction Message* (with the possible exception of the power control subchannel) by the action time of the message.

The base station shall transmit identical power control symbols on all identical power control subchannels that were identified as such in the last *Extended Handoff Direction Message* or *Handoff Direction Message*.

The base station shall use the same long code mask on the Reverse Traffic Channel and on all Forward Traffic Channels whose associated pilots are in the Active Set.

#### 7.6.6.2.5 CDMA to Analog Hard Handoff

The base station may direct the mobile station to perform a handoff from the CDMA system to the analog system by sending an *Analog Handoff Direction Message*.

### 7.7 Signaling Formats

The following sections specify the requirements on the signaling message formats transmitted on the Sync Channel, the Paging Channel, and the Forward Traffic Channel.

In any multi-bit field in the following messages, the most significant bit (MSB) shall be transmitted first.

1   **7.7.1 Sync Channel**

- 2   The Sync Channel is used to provide time and frame synchronization to the mobile station.  
3   Only one message, the *Sync Channel Message*, is sent on the Sync Channel.

4   **7.7.1.1 Sync Channel Structure**

- 5   The Sync Channel is divided into 80 ms superframes (see 7.1.3.3.2). Each superframe is  
6   divided into three 26.666... ms frames. The first bit of each frame is a SOM Bit, and the  
7   remaining bits in the frame comprise the Sync Channel frame body.

- 8   A Sync Channel message capsule is composed of a Sync Channel message and padding. A  
9   Sync Channel message consists of a length field, a message body, and a CRC field. Padding  
10   consists of zero or more bits.

- 11   Sync Channel message capsules shall begin with the first bit of the first Sync Channel  
12   frame body of a Sync Channel superframe. The base station shall set the SOM Bit  
13   immediately preceding the beginning of a Sync Channel message capsule to '1', and shall  
14   set all other SOM Bits to '0'. The base station shall transmit the Sync Channel message in  
15   consecutive Sync Channel frame bodies. The base station shall include sufficient padding  
16   bits in each Sync Channel message capsule to extend it through the bit preceding the SOM  
17   Bit at the beginning of the next Sync Channel superframe. The base station shall begin a  
18   new Sync Channel message capsule in the first Sync Channel frame of that superframe.

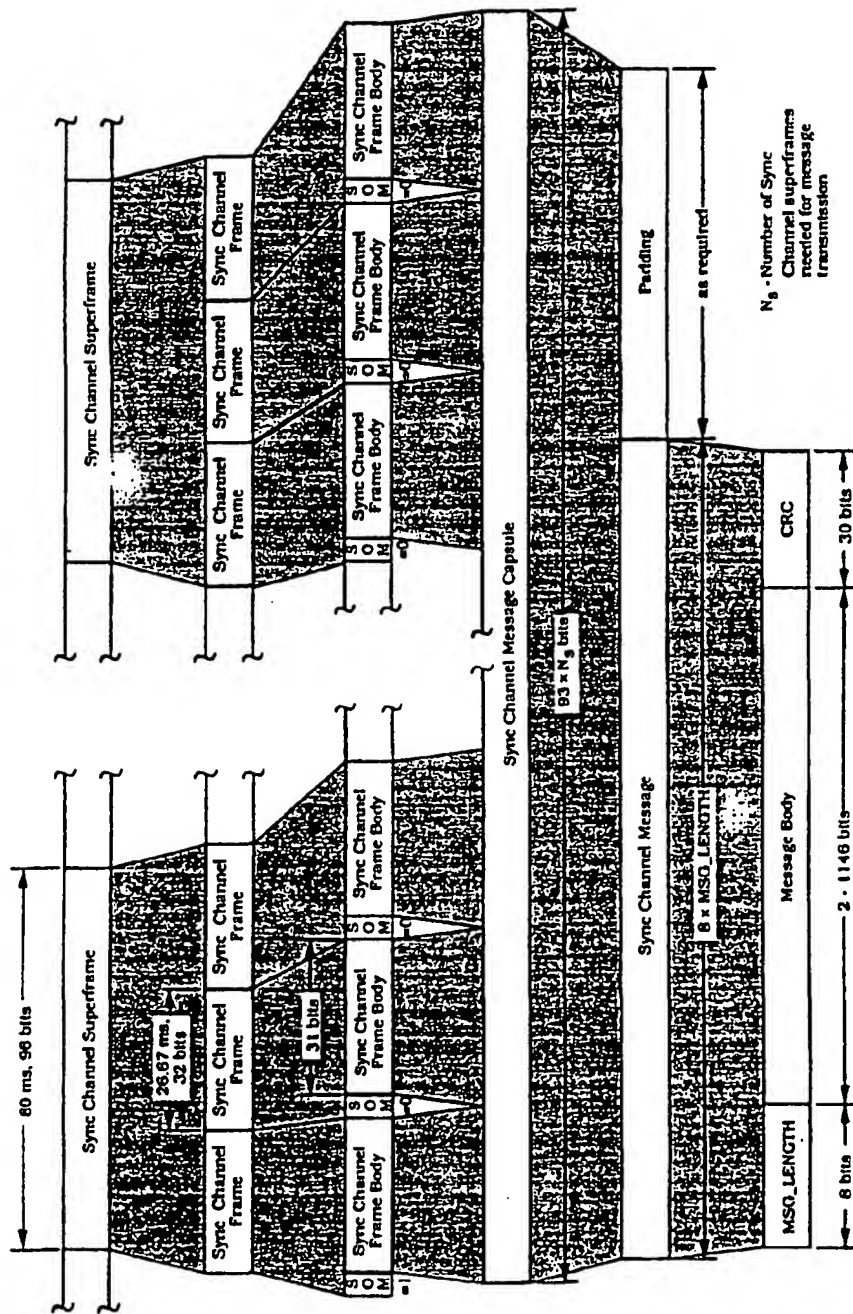


Figure 7.7.1.1-1. Sync Channel Structure (1200 bps) Example



### 7.7.1.2 Sync Channel Message Structure

The *Sync Channel Message* shall consist of an 8-bit MSG\_LENGTH field, a *Sync Channel Message* body field, and a CRC field. Padding bits shall be appended to the end of the *Sync Channel Message* so that the total of the *Sync Channel Message* length added to the length of the padding bits shall be equal to an integer multiple of 93 bits. Padding bits shall be set to '0'.

#### 7.7.1.2.1 Sync Channel MSG\_LENGTH Field

The base station shall set the MSG\_LENGTH field of the *Sync Channel Message* to the length of the *Sync Channel Message* in octets, including the MSG\_LENGTH field, the *Sync Channel Message* body, and the CRC. The MSG\_LENGTH field shall be 8 bits in length. The base station shall limit the maximum *Sync Channel Message* length to 148 octets, or 1184 bits. That is, the value of the MSG\_LENGTH field shall not exceed 148.

#### 7.7.1.2.2 Sync Channel Signaling Message CRC

A 30-bit CRC shall be computed for each *Sync Channel Message*. The CRC includes the MSG\_LENGTH field and the message body field. The generator polynomial for the CRC shall be as follows:

$$g(x) = x^{30} + x^{29} + x^{21} + x^{20} + x^{15} + x^{13} + x^{12} + x^{11} + x^8 + x^7 + x^6 + x^2 + x + 1.$$

The following procedure and the logic shown in Figure 7.7.1.2.2-1 (or equivalent) shall be used to compute the CRC:

- All shift register elements shall be initialized to logical one.<sup>15</sup>
- The switches shall be set in the up position.
- The information bit count  $k$  shall be defined as  $8 + \text{message body length in bits}$ .
- The register shall be clocked  $k$  times, with the length and message body fields of the message as the  $k$  input bits.
- The switches shall be set in the down position.
- The register shall be clocked an additional 30 times.
- The 30 additional output bits shall be the CRC field.
- The bits shall be transmitted in the order in which they appear at the output of the CRC encoder.

<sup>15</sup>Initialization of the register to ones causes the CRC for all-zero data to be non-zero.

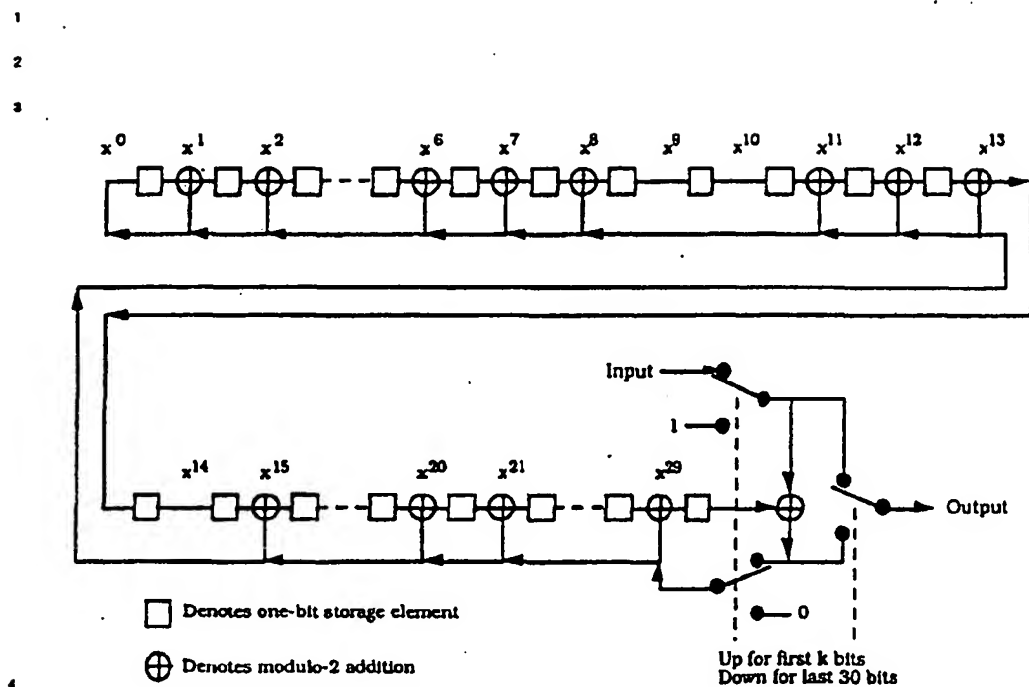


Figure 7.7.1.2.2-1. Sync Channel CRC Calculation

### 7.7.1.3 Sync Channel Message Body Format

When the base station sends a *Sync Channel Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00000001')	8
P_REV	8
MIN_P_REV	8
SID	15
NID	16
PILOT_PN	9
LC_STATE	42
SYS_TIME	36
LP_SEC	8
LTM_OFF	6
DAYLT	1
PRAT	2
RESERVED	3

MSG\_TYPE - Message type.

The base station shall set this field to '00000001'.

P\_REV - Protocol revision level.

The base station shall set this field to "00000010".

MIN\_P\_REV - Minimum protocol revision level.

Only mobile stations that support revision numbers greater than or equal to this field access the system.

The base station shall set this field to the minimum protocol revision level that it supports.<sup>16</sup>

SID - System Identification.

The base station shall set this field to the system identification number for this cellular system (see 6.6.5.2).

<sup>16</sup>It is intended that all future revisions of this specification be backward compatible. However, if a future revision is not compatible, the MIN\_P\_REV level field allows the protocol to be upgraded, preventing incompatible mobile stations from attempting system acquisition.

1	NID	- Network Identification.
2		This field serves as a sub-identifier of a system as defined by
3		the owner of the SID.
4		The base station shall set this field to the network
5		identification number for this network (see 6.6.5.2).
6	PILOT_PN	- Pilot PN sequence offset index.
7		The base station shall set this field to the pilot PN sequence
8		offset for this base station, in units of 64 PN chips.
9	LC_STATE	- Long code state.
10		The base station shall set this field to the long code state at
11		the time given by the SYS_TIME field of this message.
12	SYS_TIME	- System time.
13		The base station shall set this field to the System Time as of
14		four Sync Channel superframes (320 ms) after the end of the
15		last superframe containing any part of this <i>Sync Channel</i>
16		<i>Message</i> , minus the pilot PN sequence offset, in units of 80
17		ms (see 1.2).
18	LP_SEC	- The number of leap seconds that have occurred since the start
19		of System Time.
20		The base station shall set this field to the number of leap
21		seconds that have occurred since the start of System Time, as
22		of the time given by the SYS_TIME field of this message.
23	LTM_OFF	- Offset of local time from System Time.
24		The current local time of day is equal to $SYS\_TIME - LP\_SEC +$
25		$LTM\_OFF$ .
26		The base station shall set this field to the two's complement
27		offset of local time from System Time, in units of 30 minutes.
28	DAYLT	- Daylight savings time indicator.
29		If the daylight savings time is in effect, the base station shall
30		set this field to '1'. Otherwise, the base station shall set this
31		field to '0'.
32	PRAT	- Paging Channel data rate.
33		The base station shall set this field to the PRAT field value
34		shown in Table 7.7.1.3-1 corresponding to the data rate used
35		by the Paging Channels in the system.
36		

Table 7.7.1.3-1. Paging Channel Data Rate

PRAT Field (binary)	Paging Channel data rate
00	9600 bps
01	4800 bps
10	Reserved
11	Reserved

RESERVED - Reserved bits.

The base station shall set this field to '000'.

1    **7.7.2 Paging Channel**

2    The Paging Channel is used to send control information to mobile stations that have not  
3    been assigned to a Traffic Channel.

4    **7.7.2.1 Paging Channel Structure**

5    **7.7.2.1.1 Paging Channel Slot Structure**

6    The Paging Channel is divided into 80 ms slots. The slots are grouped into cycles of 2048  
7    slots (163.84 seconds) referred to as maximum slot cycles. Each maximum slot cycle  
8    begins at the start of the frame when System Time, in units of 80 ms, modulo 2048 is zero.  
9    The slots of each maximum slot cycle are numbered from 0 to 2047, as shown in  
10   Figure 7.7.2.1.1-1. A mobile station operating in the slotted mode monitors the Paging  
11   Channel using a slot cycle with a length that is a submultiple of the maximum slot cycle  
12   length (see 6.6.2.1.1.3).



**Figure 7.7.2.1.1-1. Paging Channel Structure Example**

1 7.7.2.1.2 Paging Channel Message Capsule Structure

2 Each 80 ms slot is composed of four Paging Channel frames, each 20 ms in length. As  
3 shown in Figure 7.7.2.1.1-1, a 20 ms long Paging Channel frame is divided into 10 ms long  
4 Paging Channel half frames. The first bit in any Paging Channel half frame is an SCI  
5 (Synchronized Capsule Indicator) bit.

6 A Paging Channel message capsule is composed of a Paging Channel message and padding.  
7 A Paging Channel message consists of a length field, a message body, and a CRC field.  
8 Padding consists of zero or more bits.

9 The base station may transmit synchronized or unsynchronized Paging Channel message  
10 capsules. A synchronized message capsule starts on the second bit of a Paging Channel  
11 half frame. An unsynchronized message capsule begins immediately after the previous  
12 message capsule.

13 If after the end of a Paging Channel message there remain 8 bits or more<sup>17</sup> before the next  
14 SCI bit, the base station may transmit an unsynchronized message capsule immediately  
15 following that message. The base station shall not include any padding bits in a Paging  
16 Channel message capsule that is followed by an unsynchronized Paging Channel message  
17 capsule.

18 If after the end of a Paging Channel message there remain fewer than 8 bits before the next  
19 SCI bit, or if no unsynchronized message capsule is transmitted following a Paging Channel  
20 message capsule, the base station shall include sufficient padding bits in that message  
21 capsule to extend it through the bit preceding the next SCI bit, and the base station shall  
22 transmit a synchronized message capsule immediately following that SCI bit.<sup>18</sup> The base  
23 station shall set all padding bits to '0'.

24 When a message capsule immediately follows an SCI bit, the base station shall set that SCI  
25 bit to '1'. The base station shall set all other SCI bits to '0'.

26 The base station shall transmit the first message that begins in each Paging Channel slot in  
27 a synchronized message capsule.<sup>19</sup>

---

<sup>17</sup>This restriction permits the mobile station to determine whether an unsynchronized message is being transmitted by checking the first 8 bits after the end of the message for a non-zero MSG\_LENGTH value.

<sup>18</sup>This implies that all bits transmitted on the Paging Channel are either SCI bits or are part of a message capsule.

<sup>19</sup>This permits mobile stations operating in the slotted mode to obtain synchronization immediately after becoming active.



### 1 7.7.2.2 Paging Channel Message Structure

#### 2 7.7.2.2.1 Paging Channel MSG\_LENGTH Field

3 The base station shall set the MSG\_LENGTH field of each Paging Channel message to the  
4 length of the message in octets, including the MSG\_LENGTH field, the message body, and  
5 the CRC. The MSG\_LENGTH field shall be 8 bits in length. Base stations may send Paging  
6 Channel Messages of maximum length not to exceed the requirements in 7.6.2.

#### 7 7.7.2.2.2 Paging Channel Message CRC

8 A 30-bit CRC shall be computed for each Paging Channel signaling message. The CRC  
9 shall include the MSG\_LENGTH field and the message body field. The generator polynomial  
10 for the CRC shall be as follows:

$$11 \quad g(x) = x^{30} + x^{29} + x^{21} + x^{20} + x^{15} + x^{13} + x^{12} + x^{11} + x^8 + x^7 + x^6 + x^2 + x + 1.$$

12 The CRC shall be the value computed by the following procedure and the logic shown in  
13 Figure 7.7.2.2.2-1:

- 14 • All shift register elements shall be initialized to logical one.<sup>20</sup>
- 15 • The switches shall be set in the up position.
- 16 • The information bit count k shall be defined as 8 + message body length in bits.
- 17 • The register shall be clocked k times, with the length and message body fields of the  
18 message as the k input bits.
- 19 • The switches shall be set in the down position.
- 20 • The register shall be clocked an additional 30 times.
- 21 • The 30 additional output bits shall be the CRC field.
- 22 • The bits shall be transmitted in the order in which they appear at the output of the  
23 CRC encoder.
- 24

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<sup>20</sup>Initialization of the register to ones causes the CRC for all-zero data to be non-zero.

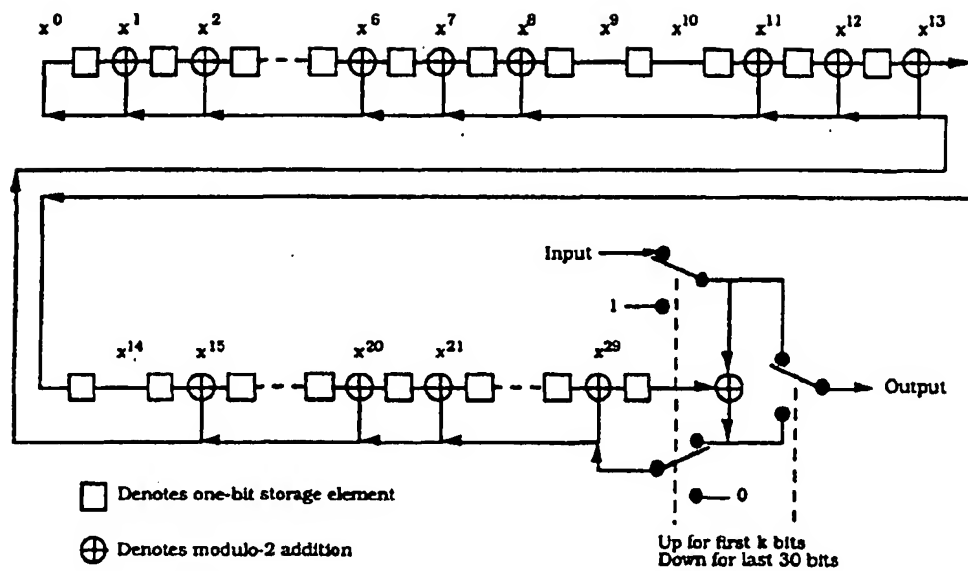


Figure 7.7.2.2-1. Paging Channel CRC Calculation

### 7.7.2.3 Paging Channel Message Body Format

The Paging Channel messages are summarized in Table 7.7.2.3-1. Paging Channel messages are grouped into the message groups shown in the table. Messages of each group are sent either periodically or on an as-needed basis.

**Table 7.7.2.3-1. Paging Channel Messages**

Message Name	Message Type (binary)
System Parameters Message	00000001
Access Parameters Message	00000010
Neighbor List Message	00000011
CDMA Channel List Message	00000100
Slotted Page Message	00000101
Page Message	00000110
Order Message	00000111
Channel Assignment Message	00001000
Data Burst Message	00001001
Authentication Challenge Message	00001010
SSD Update Message	00001011
Feature Notification Message	00001100
Extended System Parameters Message	00001101
Reserved	00001110
Reserved	00001111
Service Redirection Message	00010000
General Page Message	00010001
Global Service Redirection Message	00010010
Null Message	-

### 7.7.2.3.1 Common Fields

Many Paging Channel messages include the following common fields defining the mobile station to which the message is addressed.

**ADDR\_TYPE** - Address field type.

The base station shall set this field to the value shown in Table 7.7.2.3.1-1 corresponding to the address type contained in the ADDRESS field.

**Table 7.7.2.3.1-1. Address Types**

Description	ADDR_TYPE (binary)	ADDR_LEN (octets)
MIN (MIN1 and MIN2)	000	5
ESN	001	4 to 7
IMSI	010	5 to 7
Reserved	011	-
Reserved	100	-
BROADCAST	101	variable
Reserved	110	-
Reserved	111	-

**ADDR\_LEN** - Address field length.

The base station shall set this field to the number of octets in the ADDRESS field.

**ADDRESS** - Mobile station or broadcast address.

The base station shall set this field to the mobile station or broadcast address, using the address type specified in the ADDR\_TYPE field.

If ADDR\_TYPE is equal to '000', the ADDRESS field shall consist of the following subfields:

Subfield	Length (bits)
MIN1	24
MIN2	10
RESERVED	6

If ADDR\_TYPE is equal to '001', the ADDRESS field shall consist of the following subfields:

Subfield	Length (bits)
ESN	$8 \times \text{ADDR\_LEN}$

If ADDR\_TYPE is equal to '010', the ADDRESS field shall consist of the following subfields:

Subfield	Length (bits)
IMSI_CLASS	1
IMSI class specific subfields	$7 + 8 \times (\text{ADDR\_LEN} - 1)$

If ADDR\_TYPE is equal to '101', the ADDRESS field shall consist of the following subfields:

Subfield	Length (bits)
BC_ADDR	$8 \times \text{ADDR\_LEN}$

BC\_ADDR - Broadcast address.

The base station shall set this field according to the requirements applicable to the burst type of the *Data Burst Message* containing this address.

If the ADDR\_TYPE is equal to '000', the base station shall include the following three fields in the ADDRESS field:

MIN1 - First part of the mobile identification number (MIN).

The base station shall set this subfield to the MIN1 value for the MIN specified by this address field (see 6.3.1).

MIN2 - Second part of the mobile identification number (MIN).

The base station shall set this subfield to the MIN2 value for the MIN specified by this address field (see 6.3.1).

RESERVED - Reserved bits.

The base station shall set this field to '000000'.

If the ADDR\_TYPE is equal to '001', the base station shall include the following field in the ADDRESS field:

ESN - Mobile station's electronic serial number.

The base station shall set this field to the electronic serial number of the mobile station to which this message is addressed.

1 If the ADDR\_TYPE is equal to '010', the base station shall include the following fields in the  
2 ADDRESS field:

- 3       IMSI\_CLASS   - The base station shall set this field as described in  
4                               7.6.2.1.5.1.
- 5       IMSI class specific   - IMSI class specific subfields.  
6                               subfields       The base station shall set this field to the appropriate class  
7                               specific subfields as described below.

8

9       If IMSI\_CLASS is equal to '0', the following IMSI class specific  
10       subfields shall be used:

IMSI Class Specific Subfield	Length (bits)
IMSI_CLASS_0_TYPE	2
IMSI class 0 type specific subfields	see Table 7.7.2.3.1-2

11

12       If IMSI\_CLASS is equal to '1', the following IMSI class specific  
13       subfields shall be used:

IMSI Class Specific Subfield	Length (bits)
IMSI_CLASS_1_TYPE	1
IMSI class 0 type specific subfields	see Table 7.7.2.3.1-3

14

15       If the IMSI\_CLASS is equal to '0', the base station shall include the following fields in the  
16       IMSI class specific subfields:

- 17       IMSI\_CLASS\_0\_TYPE   - The base station shall set this field as described in 7.6.2.1.5.1  
18                               (see Table 7.7.2.3.1-2).

19

20

Table 7.7.2.3.1-2. IMSI Class 0 Types

Description	IMSI_CLASS 0_TYPE (binary)	Length of IMSI Class 0 Type Specific Subfields (bits)
IMSI_S included	00	37
IMSI_S and IMSI_11_12 included	01	45
IMSI_S and MCC included	10	45
IMSI_S, IMSI_11_12, and MCC included	11	53

21

IMSI class 0 type - IMSI class 0 type specific subfields.

specific subfields The base station shall set this field to the IMSI class 0 type specific fields as described below.

If the IMSI\_CLASS is equal to '1', the base station shall include the following fields in the IMSI class specific subfields:

IMSI\_CLASS\_1\_TYPE - The base station shall set this field as described in 7.6.2.1.5.1 (see Table 7.7.2.3.1-3).

**Table 7.7.2.3.1-3. IMSI Class 1 Types**

Description	IMSI_CLASS_1_TYPE (binary)	Length of IMSI Class 1 Type Specific Subfields (bits)
IMSI_S and IMSI_11_12 included	0	46
IMSI_S, IMSI_11_12, and MCC included	1	54

IMSI class 1 type - IMSI class 1 type specific subfields.

specific subfields The base station shall set this field to the IMSI class 1 type specific fields as described below.

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '00', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	3
IMSI_S	34

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '01', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	4
IMSI_11_12	7
IMSI_S	34

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '10', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	1
MCC	10
IMSI_S	34

If the IMSI\_CLASS is equal to '0' and IMSI\_CLASS\_0\_TYPE is equal to '11', then the IMSI class 0 type specific subfields shall consist of:

IMSI Class 0 Type Specific Subfield	Length (bits)
RESERVED	2
MCC	10
IMSI_11_12	7
IMSI_S	34

If IMSI\_CLASS is equal to '1' and IMSI\_CLASS\_1\_TYPE is equal to '0', then the IMSI class 1 type specific subfields shall consist of:

IMSI Class 1 Type Specific Subfield	Length (bits)
RESERVED	2
IMSI_ADDR_NUM	3
IMSI_11_12	7
IMSI_S	34

If IMSI\_CLASS is equal to '1' and IMSI\_CLASS\_1\_TYPE is equal to '1', then the IMSI class 1 type specific subfields shall consist of:

IMSI Class 1 Type Specific Subfield	Length (bits)
IMSI_ADDR_NUM	3
MCC	10
IMSI_11_12	7
IMSI_S	34



1 If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '00', the base  
 2 station shall include the following fields in the IMSI class 0 type specific subfields:

- 3       RESERVED   -   Reserved bits.  
                     The base station shall set these bits to '000'.
- 5       IMSI\_S     -   Last ten digits of the IMSI.  
                     The base station shall set this field to IMSI\_S. See 6.3.1.

7 If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '01', the base  
 8 station shall include the following fields in the IMSI class 0 type specific subfields:

- 9       RESERVED   -   Reserved bits.  
                     The base station shall set these bits to '0000'.
- 11       IMSI\_11\_12 -   The 11th and 12th digits of IMSI.  
                     The base station shall set this field to IMSI\_11\_12. See 6.3.1.
- 13       IMSI\_S     -   Last ten digits of the IMSI.  
                     The base station shall set this field to IMSI\_S. See 6.3.1.

15 If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '10', the base  
 16 station shall include the following fields in the IMSI class 0 type specific subfields:

- 17       RESERVED   -   Reserved bit.  
                     The base station shall set this bit to '0'.
- 19       MCC       -   Mobile country code.  
                     The base station shall set this field to the MCC. See 6.3.1.
- 21       IMSI\_S     -   Last ten digits of the IMSI.  
                     The base station shall set this field to IMSI\_S. See 6.3.1.

23 If the IMSI\_CLASS is equal to '0' and the IMSI\_CLASS\_0\_TYPE is equal to '11', the base  
 24 station shall include the following fields in the IMSI class 0 type specific subfields:

- 25       RESERVED   -   Reserved bits.  
                     The base station shall set these bits to '00'.
- 27       MCC       -   Mobile country code.  
                     The base station shall set this field to the MCC. See 6.3.1.
- 29       IMSI\_11\_12 -   The 11th and 12th digits of IMSI.  
                     The base station shall set this field to IMSI\_11\_12. See 6.3.1.
- 31       IMSI\_S     -   Last ten digits of the IMSI.  
                     The base station shall set this field to IMSI\_S. See 6.3.1.

1 If the IMSI\_CLASS is equal to '1' and the IMSI\_CLASS\_1\_TYPE is equal to '0', the base  
 2 station shall include the following fields in the IMSI class 1 type specific subfields:

- 3       RESERVED   - Reserved bits.  
                   The base station shall set these bits to '00'.
- 4       IMSI\_ADDR\_NUM   - Number of IMSI address digits.  
                   The base station shall set this field to four less than the  
                   number of digits in the NMSI.
- 5       IMSI\_11\_12   - The 11th and 12th digits of IMSI.  
                   The base station shall set this field to IMSI\_11\_12. See 6.3.1.
- 6       IMSI\_S       - Last ten digits of the IMSI.  
                   The base station shall set this field to IMSI\_S. See 6.3.1.

7 If the IMSI\_CLASS is equal to '1' and the IMSI\_CLASS\_1\_TYPE is equal to '1', the base  
 8 station shall include the following fields in the IMSI class 1 type specific subfields:

- 9       IMSI\_ADDR\_NUM   - Number of IMSI address digits.  
                   The base station shall set this field to four less than the  
                   number of digits in the NMSI.
- 10       MCC       - Mobile country code.  
                   The base station shall set this field to the MCC. See 6.3.1.
- 11       IMSI\_11\_12   - The 11th and 12th digits of IMSI.  
                   The base station shall set this field to IMSI\_11\_12. See 6.3.1.
- 12       IMSI\_S       - Last ten digits of the IMSI.  
                   The base station shall set this field to IMSI\_S. See 6.3.1.

#### 13 7.7.2.3.2 Message Body Contents

14 The following sections specify the contents of the message body for each message that may  
 15 be sent on the Paging Channel.

- 1 7.7.2.3.2.1 System Parameters Message
- 2 When the base station sends a *System Parameters Message*, it shall use the following fixed-
- 3 length message format:

Field	Length (bits)
MSG_TYPE ('00000001')	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
SID	15
NID	16
REG_ZONE	12
TOTAL_ZONES	3
ZONE_TIMER	3
MULT_SIDS	1
MULT_NIDS	1
BASE_ID	16
BASE_CLASS	4
PAGE_CHAN	3
MAX_SLOT_CYCLE_INDEX	3
HOME_REG	1
FOR_SID_REG	1
FOR_NID_REG	1
POWER_UP_REG	1
POWER_DOWN_REG	1
PARAMETER_REG	1
REG_PRD	7
BASE_LAT	22
BASE_LONG	23
REG_DIST	11
SRCH_WIN_A	4

(continues on next page)

Field	Length (bits)
SRCH_WIN_N	4
SRCH_WIN_R	4
NGHBR_MAX_AGE	4
PWR_REP_THRESH	5
PWR_REP_FRAMES	4
PWR_THRESH_ENABLE	1
PWR_PERIOD_ENABLE	1
PWR_REP_DELAY	5
RESCAN	1
T_ADD	6
T_DROP	6
T_COMP	4
T_TDROP	4
EXT_SYS_PARAMETER	1
RESERVED	2
GLOBAL_REDIRECT	1

2  
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18

**MSG\_TYPE** - Message type.

The base station shall set this field to '00000001'.

**PILOT\_PN** - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

**CONFIG\_MSG\_SEQ** - Configuration message sequence number.

The base station shall set this field to CONFIG\_SEQ (see 7.6.2.2).

**SID** - System identification.

The base station shall set this field to the system identification number for this cellular system (see 6.6.5.2).

**NID** - Network identification.

This field serves as a sub-identifier of a system as defined by the owner of the SID.

The base station shall set this field to the network identification number for this network (see 6.6.5.2).

- 1           **REG\_ZONE**   - Registration zone.
- 2                           The base station shall set this field to its registration zone
- 3                           number (see 6.6.5.1.5).
- 4           **TOTAL\_ZONES**   - Number of registration zones to be retained.
- 5                           The base station shall set this field to the number of
- 6                           registration zones the mobile station is to retain for purposes
- 7                           of zone-based registration (see 6.6.5.1.5).
- 8                           If zone-based registration is to be disabled, the base station
- 9                           shall set this field to '000'.
- 10          **ZONE\_TIMER**   - Zone timer length.
- 11                          The base station shall set this field to the ZONE\_TIMER value
- 12                          shown in Table 7.7.2.3.2.1-1 corresponding to the length of
- 13                          the zone registration timer to be used by mobile stations.

Table 7.7.2.3.2.1-1. Value of Zone Timer

ZONE_TIMER Value (binary)	Timer Length (Minutes)
000	1
001	2
010	5
011	10
100	20
101	30
110	45
111	60

- 16
- 17          **MULT\_SIDS**   - Multiple SID storage indicator.
- 18                          If mobile stations may store entries of SID\_NID\_LIST
- 19                          containing different SIDs, the base station shall set this field
- 20                          to '1'; otherwise the base station shall set this field to '0'.
- 21          **MULT\_NIDS**   - Multiple NID storage indicator.
- 22                          If mobile stations may store multiple entries of SID\_NID\_LIST
- 23                          having the same SID (with different NIDs), the base station
- 24                          shall set this field to '1'; otherwise the base station shall set
- 25                          this field to '0'.
- 26          **BASE\_ID**    - Base station identification.
- 27                          The base station shall set this field to its identification
- 28                          number.

1        **BASE\_CLASS**    -    Base station class.

2                                The base station shall set this field to the value shown in  
3                                Table 7.7.2.3.2.1-2 corresponding to the class of service  
4                                provided by this base station.

6                                **Table 7.7.2.3.2.1-2. Base Station Classes**

Value (binary)	Class of Service Provided
0000	Public Macrocellular System
All other values are reserved.	

7  
8        **PAGE\_CHAN**    -    Number of Paging Channels.

9                                The base station shall set this field to the number of Paging  
10                                Channels on this CDMA Channel. The base station shall not  
11                                set this field to '000'.

12        **MAX\_SLOT\_CYCLE-**    -    Maximum slot cycle index.

13                                **\_INDEX**                                The base station shall set this field to the  
14                                **SLOT\_CYCLE\_INDEX** value corresponding to the maximum  
15                                slot cycle length permitted (see 6.6.2.1.1).

16        **HOME\_REG**    -    Home registration indicator.

17                                If mobile stations that are not roaming (see 6.6.5.3) and have  
18                                **MOB\_TERM\_HOME** equal to '1' are to be enabled for  
19                                autonomous registrations, the base station shall set this field  
20                                to '1'. If such mobile stations are not to be enabled for  
21                                autonomous registration, the base station shall set this field  
22                                to '0'.

23        **FOR\_SID\_REG**    -    SID roamer registration indicator.

24                                If mobile stations that are foreign SID roamers (see 6.6.5.3)  
25                                and have **MOB\_TERM\_FOR\_SID** equal to '1' are to be enabled  
26                                for autonomous registration, the base station shall set this  
27                                field to '1'. If such mobile stations are not to be enabled for  
28                                autonomous registration, the base station shall set this field  
29                                to '0'.

30        **FOR\_NID\_REG**    -    NID roamer registration indicator.

31                                If mobile stations that are foreign NID roamers (see 6.6.5.3)  
32                                and have **MOB\_TERM\_FOR\_NID** equal to '1' are to be enabled  
33                                for autonomous registration, the base station shall set this  
34                                field to '1'. If such mobile stations are not to be enabled for  
35                                autonomous registration, the base station shall set this field  
36                                to '0'.

1	POWER_UP_REG	-	Power-up registration indicator.
2			If mobile stations enabled for autonomous registration are to
3			register immediately after powering on and receiving the
4			system overhead messages, the base station shall set this field
5			to '1'. Otherwise, the base station shall set this field to '0'.
6	POWER_DOWN_REG	-	Power-down registration indicator.
7			If mobile stations enabled for autonomous registration are to
8			register immediately before powering down, the base station
9			shall set this field to '1'. Otherwise, the base station shall set
10			this field to '0'.
11	PARAMETER_REG	-	Parameter-change registration indicator.
12			If mobile stations are to register on parameter change events
13			as specified in 6.6.5.1.6, the base station shall set this field to
14			'1'. If not, the base station shall set this field to '0'.
15	REG_PRD	-	Registration period.
16			If mobile stations are not to perform timer-based registration,
17			the base station shall set this field to '0000000'. If mobile
18			stations are to perform timer-based registration, the base
19			station shall set this field to the value in the range 29 to 85
20			inclusive, such that the desired timer value is
21			$\lfloor 2\text{REG\_PRD}/4 \rfloor \times 0.08 \text{ seconds.}$
22	BASE_LAT	-	Base station latitude.
23			The base station shall set this field to its latitude in units of
24			0.25 second, expressed as a two's complement signed number
25			with positive numbers signifying North latitudes. The base
26			station shall set this field to a value in the range -1296000 to
27			1296000 inclusive (corresponding to a range of -90° to +90°).
28	BASE_LONG	-	Base station longitude.
29			The base station shall set this field to its longitude in units of
30			0.25 second, expressed as a two's complement signed number
31			with positive numbers signifying East longitude. The base
32			station shall set this field to a value in the range -2592000 to
33			2592000 inclusive (corresponding to a range of -180° to
34			+180°).
35	REG_DIST	-	Registration distance.
36			If mobile stations are to perform distance-based registration,
37			the base station shall set this field to the non-zero "distance"
38			beyond which the mobile station is to re-register (see
39			6.6.5.1.4). If mobile stations are not to perform distance-
40			based registration, the base station shall set this field to 0.
41	SRCH_WIN_A	-	Search window size for the Active Set and Candidate Set.
42			The base station shall set this field to the value shown in
43			Table 6.6.6.2.1-1 corresponding to the search window size to
44			be used by mobile stations for the Active Set and Candidate
45			Set.

1	SRCH_WIN_N	- Search window size for the Neighbor Set.
2		The base station shall set this field to the value shown in
3		Table 6.6.6.2.1-1 corresponding to the search window size to
4		be used by mobile stations for the Neighbor Set.
5	SRCH_WIN_R	- Search window size for the Remaining Set.
6		The base station shall set this field to the value shown in
7		Table 6.6.6.2.1-1 corresponding to the search window size to
8		be used by mobile stations for the Remaining Set.
9	NGHBR_MAX_AGE	- Neighbor Set maximum AGE.
10		The base station shall set this field to the maximum AGE
11		value beyond which mobile stations are to drop members from
12		the Neighbor Set (see 6.6.6.2.6.3).
13	PWR_REP_THRESH	- Power control reporting threshold.
14		The base station shall set this field to the number of bad
15		frames (see 6.2.2.2) to be received in a measurement period
16		before mobile stations are to generate a <i>Power Measurement</i>
17		<i>Report Message</i> (see 6.6.4.1.1). If the base station sets
18		PWR_THRESH_ENABLE to '1', it shall not set this field to
19		'00000'.
20	PWR_REP_FRAMES	- Power control reporting frame count.
21		The base station shall set this field to the value such that the
22		number given by
23		$\lfloor 2(PWR\_REP\_FRAMES/2) \times 5 \rfloor \text{ frames}$
24		is the number of frames over which mobile stations are to
25		count frame errors.
26	PWR_THRESH-	- Threshold report mode indicator.
27	_ENABLE	
28		If mobile stations are to generate threshold <i>Power Measurement</i>
29		<i>Report Messages</i> , the base station shall set this
30		field to '1'. If mobile stations are not to generate threshold
31		<i>Power Measurement Report Messages</i> , the base station shall
32		set this field to '0'.
33	PWR_PERIOD-	- Periodic report mode indicator.
34	_ENABLE	
35		If mobile stations are to generate periodic <i>Power Measurement</i>
36		<i>Report Messages</i> , the base station shall set this field to '1'. If
37		mobile stations are not to generate periodic <i>Power Measurement</i>
38		<i>Report Messages</i> , the base station shall set this
39		field to '0'.
40	PWR_REP_DELAY	- Power report delay.
41		The period that mobile stations wait following a <i>Power Measurement</i>
42		<i>Report Message</i> before restarting frame counting
43		for power control purposes.
44		The base station shall set this field to the power report delay
45		value, in units of 4 frames (see 6.6.4.1.1).



1	RESCAN	-	Rescan indicator.
2			If mobile stations are to re-initialize and re-acquire the system
3			upon receiving this message, the base station shall set this
4			field to '1'. Otherwise, the base station shall set this field
5			to '0'.
6	T_ADD	-	Pilot detection threshold.
7			This value is used by mobile stations to trigger the sending of
8			the <i>Pilot Strength Measurement Message</i> initiating the handoff
9			process (see 6.6.6).
10			The base station shall set this field to the pilot detection
11			threshold, expressed as an unsigned binary number equal to
12			$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ .
13	T_DROP	-	Pilot drop threshold.
14			This value is used by mobile stations to start a handoff drop
15			timer for pilots in the Active Set and the Candidate Set (see
16			6.6.6.2.3).
17			The base station shall set this field to the pilot drop threshold,
18			expressed as an unsigned binary number equal to
19			$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ .
20	T_COMP	-	Active Set versus Candidate Set comparison threshold.
21			Mobile stations transmit a <i>Pilot Strength Measurement</i>
22			<i>Message</i> when the strength of a pilot in the Candidate Set
23			exceeds that of a pilot in the Active Set by this margin (see
24			6.6.6.2.5.2).
25			The base station shall set this field to the threshold Candidate
26			Set pilot to Active Set pilot ratio, in units of 0.5 dB.
27	T_TDROP	-	Drop timer value.
28			Timer value after which an action is taken by mobile stations
29			for a pilot that is a member of the Active Set or Candidate Set,
30			and whose strength has not become greater than T_DROP. If
31			the pilot is a member of the Active Set, a <i>Pilot Strength</i>
32			<i>Measurement Message</i> is issued. If the pilot is a member of
33			the Candidate Set, it will be moved to the Neighbor Set.
34			The base station shall set this field to the T_TDROP value
35			shown in Table 6.6.6.2.3-1 corresponding to the drop timer
36			value to be used by mobile stations.
37	EXT_SYS_PARAMETER	-	Extended System Parameters Message indicator.
38			If the base station is sending the <i>Extended System Parameters</i>
39			<i>Message</i> on the Paging Channel, it shall set this field to '1'.
40			Otherwise, it shall set this field to '0'.
41	RESERVED	-	Reserved bits.
42			The base station shall set this field to '00'.

- 1 GLOBAL\_REDIRECT - *Global Service Redirection Message* indicator.  
2  
3 If the base station is sending the *Global Service Redirection*  
4 *Message* on the Paging Channel, it shall set this field to '1'.  
Otherwise, it shall set this field to '0'.

#### 7.7.2.3.2.2 Access Parameters Message

The *Access Parameters Message* defines the parameters used by mobile stations when transmitting to the base station on an Access Channel. When the base station sends an *Access Parameters Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE (00000010)	8
PILOT_PN	9
ACC_MSG_SEQ	6
ACC_CHAN	5
NOM_PWR	4
INIT_PWR	5
PWR_STEP	3
NUM_STEP	4
MAX_CAP_SZ	3
PAM_SZ	4
PSIST(0-9)	6
PSIST(10)	3
PSIST(11)	3
PSIST(12)	3
PSIST(13)	3
PSIST(14)	3
PSIST(15)	3
MSG_PSIST	3
REG_PSIST	3
PROBE_PN_RAN	4
ACC_TMO	4
PROBE_BKOFF	4
BKOFF	4

(continues on next page)

Field	Length (bits)
MAX_REQ_SEQ	4
MAX_RSP_SEQ	4
AUTH	2
RAND	0 or 32
RESERVED	7

- 2
- 3       MSG\_TYPE   -   Message type.
- 4                   The base station shall set this field to '00000010'.
- 5       PILOT\_PN   -   Pilot PN sequence offset index.
- 6                   The base station shall set this field to the pilot PN sequence
- 7                   offset for this base station, in units of 64 PN chips.
- 8       ACC\_MSG\_SEQ -   Access parameters message sequence number.
- 9                   The base station shall set this field to ACC\_CONFIG\_SEQ
- 10                  (sec 7.6.2.2).
- 11       ACC\_CHAN   -   Number of Access Channels.
- 12                   The base station shall set this field to one less than the
- 13                   number of Access Channels associated with this Paging
- 14                   Channel.
- 15       NOM\_PWR    -   Nominal transmit power offset.
- 16                   The base station shall set this field to the correction factor to
- 17                   be used by mobile stations in the open loop power estimate,
- 18                   expressed as a two's complement value in units of 1 dB
- 19                   (sec 6.1.2.3.1).
- 20       INIT\_PWR   -   Initial power offset for access.
- 21                   The base station shall set this field to the correction factor to
- 22                   be used by mobile stations in the open loop power estimate for
- 23                   the initial transmission on an Access Channel, expressed as a
- 24                   two's complement value in units of 1 dB (sec 6.1.2.3.1).
- 25       PWR\_STEP    -   Power increment.
- 26                   The base station shall set this field to the value by which
- 27                   mobile stations are to increase their transmit power between
- 28                   successive access probes in an access probe sequence, in
- 29                   units of 1 dB.
- 30       NUM\_STEP    -   Number of access probes.
- 31                   The base station shall set this field to one less than the
- 32                   maximum number of access probes mobile stations are to
- 33                   transmit in a single access probe sequence.

1	MAX_CAP_SZ	-	Maximum Access Channel message capsule size.
2			The base station shall set this field to the value in the range
3			0 to 7, three less than the maximum number of Access
4			Channel frames in an Access Channel message capsule.
5	PAM_SZ	-	Access Channel preamble length.
6			The base station shall set this field to one less than the
7			number of Access Channel frames that mobile stations are to
8			transmit in each Access Channel preamble.
9	PSIST(0-9)	-	Persistence value for access overload classes 0 through 9.
10			If mobile stations in access overload classes 0 through 9 are
11			permitted to transmit requests on the Access Channel, the
12			base station shall set this field to the persistence value to be
13			used. If such mobile stations are not permitted to transmit
14			requests on the Access Channel, the base station shall set
15			this field to '11111'.
16	PSIST(10)	-	Persistence value for access overload class 10 (test mobile
17			stations).
18			If mobile stations in access overload class 10 are permitted to
19			transmit requests on the Access Channel, the base station
20			shall set this field to the persistence value to be used. If such
21			mobile stations are not permitted to transmit requests on the
22			Access Channel, the base station shall set this field to '111'.
23	PSIST(11)	-	Persistence value for access overload class 11 (emergency
24			mobile stations).
25			If mobile stations in access overload class 11 are permitted to
26			transmit requests on the Access Channel, the base station
27			shall set this field to the persistence value to be used. If such
28			mobile stations are not permitted to transmit requests on the
29			Access Channel, the base station shall set this field to '111'.
30	PSIST(12)	-	Persistence value for access overload class 12.
31			If mobile stations in access overload class 12 are permitted to
32			transmit requests on the Access Channel, the base station
33			shall set this field to the persistence value to be used. If such
34			mobile stations are not permitted to transmit requests on the
35			Access Channel, the base station shall set this field to '111'.
36	PSIST(13)	-	Persistence value for access overload class 13.
37			If mobile stations in access overload class 13 are permitted to
38			transmit requests on the Access Channel, the base station
39			shall set this field to the persistence value to be used. If such
40			mobile stations are not permitted to transmit requests on the
41			Access Channel, the base station shall set this field to '111'.

- 1 PSIST(14) - Persistence value for access overload class 14.  
 2 If mobile stations in access overload class 14 are permitted to  
 3 transmit requests on the Access Channel, the base station  
 4 shall set this field to the persistence value to be used. If such  
 5 mobile stations are not permitted to transmit requests on the  
 6 Access Channel, the base station shall set this field to '111'.
- 7 PSIST(15) - Persistence value for access overload class 15.  
 8 If mobile stations in access overload class 15 are permitted to  
 9 transmit requests on the Access Channel, the base station  
 10 shall set this field to the persistence value to be used. If such  
 11 mobile stations are not permitted to transmit requests on the  
 12 Access Channel, the base station shall set this field to '111'.
- 13 MSG\_PSIST - Persistence modifier for Access Channel attempts for message  
 14 transmissions.  
 15 A mobile station multiplies its transmission probability by  
 16  $2^{\text{MSG\_PSIST}}$  for such attempts.  
 17 The base station shall set this field to the persistence modifier  
 18 for Access Channel attempts for message transmissions.
- 19 REG\_PSIST - Persistence modifier for Access Channel attempts for  
 20 registrations which are not responses to the *Registration*  
 21 *Request Order*.  
 22 A mobile station multiplies its transmission probability by  
 23  $2^{\text{REG\_PSIST}}$  for such attempts.  
 24 The base station shall set this field to the persistence modifier  
 25 for Access Channel attempts for registrations which are not  
 26 responses to the *Registration Request Order*.
- 27 PROBE\_PN\_RAN - Time randomization for Access Channel probes.  
 28 A mobile station delays its transmission from System Time by  
 29 RN PN chips, where RN is a number determined by hashing  
 30 between 0 and  $2^{\text{PROBE\_PN\_RAN}} - 1$  PN chips.  
 31 The base station shall set this field to the value in the range 0  
 32 to 9 inclusive such that the time randomization range is  
 33  $2^{\text{PROBE\_PN\_RAN}} - 1$  PN chips.
- 34 ACC\_TMO - Acknowledgement timeout.  
 35 The base station shall set this field to two less than the length  
 36 of time mobile stations are to wait after the end of an Access  
 37 Channel transmission before determining that the base  
 38 station did not receive the transmission, in units of 80 ms.
- 39 PROBE\_BKOFF - Access Channel probe backoff range.  
 40 The base station shall set this field to one less than the  
 41 maximum number of slots mobile stations are to delay due to  
 42 random backoff between consecutive access probes.

1	BKOFF	-	Access Channel probe sequence backoff range.
2			The base station shall set this field to one less than the
3			maximum number of slots mobile stations are to delay due to
4			random backoff between successive access probe sequences
5			and before the first access probe sequence of a response
6			access.
7	MAX_REQ_SEQ	-	Maximum number of access probe sequences for an Access
8			Channel request.
9			The base station shall set this field to the maximum number
10			of access probe sequences mobile stations are to transmit for
11			an Access Channel request. The base station shall set this
12			field to a value greater than 0.
13	MAX_RSP_SEQ	-	Maximum number of access probe sequences for an Access
14			Channel response.
15			The base station shall set this field to the maximum number
16			of access probe sequences mobile stations are to transmit for
17			an Access Channel response. The base station shall set this
18			field to a value greater than 0.
19	AUTH	-	Authentication mode.
20			If mobile stations are to include standard authentication data
21			in Access Channel messages, the base station shall set this
22			field to '01'. If mobile stations are not to include
23			authentication data in Access Channel messages, the base
24			station shall set this field to '00'. All other values are
25			reserved.
26	RAND	-	Random challenge value.
27			If the AUTH field is set to '01', the base station shall set this
28			field to the random challenge value to be used by mobile
29			stations for authentication. If the AUTH field is set to any
30			other value, the base station shall omit this field.
31	RESERVED	-	Reserved bits.
32			The base station shall set this field to '0000000'.

1 7.7.2.3.2.3 Neighbor List Message

2 When the base station sends a *Neighbor List Message*, it shall use the following variable-  
3 length message format:

Field	Length (bits)
MSG_TYPE (00000011)	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
PILOT_INC	4

Zero or more occurrences of the following record:

NGHBR_CONFIG	3
NGHBR_PN	9

RESERVED	0 - 7 (as needed)
----------	-------------------

- 5
- 6 MSG\_TYPE - Message type.
- 7 The base station shall set this field to '00000011'.
- 8 PILOT\_PN - Pilot PN sequence offset index.
- 9 The base station shall set this field to the pilot PN sequence
- 10 offset for this base station, in units of 64 PN chips.
- 11 CONFIG\_MSG\_SEQ - Configuration message sequence number.
- 12 The base station shall set this field to CONFIG\_SEQ
- 13 (see 7.6.2.2).
- 14 PILOT\_INC - Pilot PN sequence offset index increment.
- 15 A mobile station searches for Remaining Set pilots at pilot PN
- 16 sequence index values that are multiples of this value.
- 17 The base station shall set this field to the pilot PN sequence
- 18 increment, in units of 64 PN chips, that mobile stations are to
- 19 use for searching the Remaining Set. The base station should
- 20 set this field to the largest increment such that the pilot PN
- 21 sequence offsets of all its neighbor base stations are integer
- 22 multiples of that increment.
- 23 The base station shall set this field to a value in the range 1 to
- 24 15 inclusive.
- 25



The base station shall include one occurrence of the following two-field record for each member mobile stations are to place in their Neighbor Sets. The base station may include zero or more occurrences of the following record.

**NGHBR\_CONFIG** - Neighbor configuration.

The base station shall set this field to the value shown in Table 7.7.2.3.2.3-1 corresponding to the configuration of this neighbor.

**Table 7.7.2.3.2.3-1. Neighbor Configuration Field**

Value (bin)	Neighbor Configuration
000	The neighbor base station has the same configuration as the current base station.
001	The neighbor base station has a different configuration. It does have a Primary Paging Channel on the current CDMA frequency assignment.
010	The neighbor base station does not have a Paging Channel on the current CDMA frequency assignment. It does have a Primary Paging Channel on the first CDMA Channel listed in the <i>CDMA Channel List Message</i> transmitted by the current base station.
011	The neighbor base station configuration is unknown.
100-111	Reserved.

**NGHBR\_PN** - Neighbor pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this neighbor, in units of 64 PN chips.

**RESERVED** - Reserved bits.

The base station shall add reserved bits as needed in order to make the length of the entire message equal to an integer number of octets. The base station shall set these bits to '0'.

## 7.7.2.3.2.4 CDMA Channel List Message

When the base station sends a *CDMA Channel List Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000100')	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
One or more occurrences of the following field:	
CDMA_FREQ	11
RESERVED	0 - 7 (as needed)

MSG\_TYPE - Message type.

The base station shall set this field to '00000100'.

PILOT\_PN - Pilot PN sequence offset index.

The base station shall set this field to the pilot PN sequence offset for this base station, in units of 64 PN chips.

CONFIG\_MSG\_SEQ - Configuration message sequence number.

The base station shall set this field to CONFIG\_SEQ (see 7.6.2.2).

CDMA\_FREQ - CDMA Channel frequency assignment.

The order in which occurrences of this field are included gives the designations of the supported CDMA Channels as CDMA Channel 1 through CDMA Channel N.

The base station shall include one occurrence of this field for each CDMA Channel containing a Paging Channel that is supported by this base station. If the Primary CDMA Channel is supported by this base station, the base station shall include its occurrence of this field first. If the Primary CDMA Channel is not supported and the Secondary CDMA Channel is supported, the base station shall include the occurrence of this field corresponding to the Secondary CDMA Channel first.

The base station shall set each occurrence of this field to the CDMA channel number corresponding to the CDMA frequency assignment for that CDMA Channel (see 7.1.1.1).

- 1        **RESERVED**    -    Reserved bits.
- 2                    The base station shall add reserved bits as needed in order to
- 3                    make the length of the entire message equal to an integer
- 4                    number of octets. The base station shall set these bits to '0'.

## 7.7.2.3.2.5 Slotted Page Message

When the base station sends a *Slotted Page Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000101')	8
CONFIG_MSG_SEQ	6
ACC_MSG_SEQ	6
MORE_PAGES	1

Zero or more occurrences of the following record:

MSG_SEQ	3
EXT_ADDR	1
MIN1	24
MIN2	0 or 10
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

RESERVED	0 - 7 (as needed)
----------	-------------------

- MSG\_TYPE - Message type.  
The base station shall set this field to '00000101'.
- CONFIG\_MSG\_SEQ - Configuration message sequence number.  
The base station shall set this field to CONFIG\_SEQ (see 7.6.2.2).
- ACC\_MSG\_SEQ - Access parameters message sequence number.  
The base station shall set this field to ACC\_CONFIG\_SEQ (see 7.6.2.2).
- MORE\_PAGES - More slotted pages to follow indicator.  
If this message is the last *Slotted Page Message* to begin in the current Paging Channel slot, the base station shall set this field to '0'. Otherwise, the base station shall set this field to '1'.

- 1 The base station shall include one occurrence of the following four-field record for each  
 2 mobile station MIN to be specified in this message.
- 3           MSG\_SEQ   -   Message sequence number.  
 4                           The base station shall set this field to the message sequence  
 5                           number for this message (see 7.6.2.1.4).
- 6           EXT\_ADDR   -   Extra address indicator:  
 7                           If the MIN2 field is included in this record, the base station  
 8                           shall set this field to '1'. If the MIN2 field is not included in  
 9                           this record, the base station shall set this field to '0'.
- 10          MIN1       -   First part of the mobile station identification number (MIN).  
 11                           The base station shall set this field to the MIN1 value for the  
 12                           MIN specified by this record (see 2.3.1).
- 13          MIN2       -   Second part of the mobile station identification number (MIN).  
 14                           If the EXT\_ADDR field is set to '1', the base station shall set  
 15                           this field to the MIN2 value for the MIN specified by this  
 16                           record (see 2.3.1). If the EXT\_ADDR field is set to '0', the base  
 17                           station shall omit this field.
- 18          SPECIAL\_SERVICE   -   Special service option indicator.  
 19                           To request a special service option, the base station shall set  
 20                           this field to '1'. To request the default service option (Service  
 21                           Option 1), the base station shall set this field to '0'.
- 22          SERVICE\_OPTION   -   Service option.  
 23                           If the SPECIAL\_SERVICE field is set to '1', the base station  
 24                           shall set this field to the service option code shown in TSB58,  
 25                           *Administration of Parameter Value Assignments for TIA/EIA*  
 26                           *Wideband Spread Spectrum Standards*, corresponding to the  
 27                           requested service option. If the SPECIAL\_SERVICE field is set  
 28                           to '0', the base station shall omit this field.
- 29          RESERVED       -   Reserved bits.  
 30                           The base station shall add reserved bits as needed in order to  
 31                           make the length of the entire message equal to an integer  
 32                           number of octets. The base station shall set these bits to '0'.

## 7.7.2.3.2.6 Page Message

When the base station sends a *Page Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000110')	8
CONFIG_MSG_SEQ	6
ACC_MSG_SEQ	6

Zero or more occurrences of the following record:

MSG_SEQ	3
EXT_ADDR	1
MIN1	24
MIN2	0 or 10
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

RESERVED	0 - 7 (as needed)
----------	-------------------

MSG\_TYPE - Message type.

The base station shall set this field to '00000110'.

CONFIG\_MSG\_SEQ - Configuration message sequence number.

The base station shall set this field to CONFIG\_SEQ (see 7.6.2.2).

ACC\_MSG\_SEQ - Access parameters message sequence number.

The base station shall set this field to ACC\_CONFIG\_SEQ (see 7.6.2.2).

The base station shall include one occurrence of the following four-field record for each mobile station MIN to be specified in this message.

MSG\_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.2.1.4).

EXT\_ADDR - Extra address indicator.

If the MIN2 field is included in this record, the base station shall set this field to '1'. If the MIN2 field is not included in this record, the base station shall set this field to '0'.

1	MIN1	-	First part of the mobile station identification number (MIN).
2			The base station shall set this field to the MIN1 value for the
3			MIN specified by this record (see 2.3.1).
4	MIN2	-	Second part of the mobile station identification number (MIN).
5			If the EXT_ADDR field is set to '1', the base station shall set
6			this field to the MIN2 value for the MIN specified by this
7			record (see 2.3.1). If the EXT_ADDR field is set to '0', the base
8			station shall omit this field.
9	SPECIAL_SERVICE	-	Special service option indicator.
10			To request a special service option, the base station shall set
11			this field to '1'. To request the default service option (Service
12			Option 1), the base station shall set this field to '0'.
13	SERVICE_OPTION	-	Service option.
14			If the SPECIAL_SERVICE field is set to '1', the base station
15			shall set this field to the service option code shown in TSB58,
16			<i>Administration of Parameter Value Assignments for TIA/EIA</i>
17			<i>Wideband Spread Spectrum Standards</i> , corresponding to the
18			requested service option. If the SPECIAL_SERVICE field is set
19			to '0', the base station shall omit this field.
20	RESERVED	-	Reserved bits.
21			The base station shall add reserved bits as needed in order to
22			make the length of the entire message equal to an integer
23			number of octets. The base station shall set these bits to '0'.

1 7.7.2.3.2.7 Order Message

2 When the base station sends an Order Message, it shall use the following variable-length  
3 message format:

Field	Length (bits)
MSG_TYPE ('00000111')	8

One or more occurrences of the following record:

ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ADDR_TYPE	3
ADDR_LEN	4
ADDRESS	8 × ADDR_LEN
ORDER	6
ADD_RECORD_LEN	3
order-specific fields (if used)	8 × ADD_RECORD_LEN

RESERVED	2
----------	---

5  
6 MSG\_TYPE - Message type.

7 The base station shall set this field to '00000111'.

8  
9 The base station shall include one or more occurrences of the following variable-length  
10 order record:

11 ACK\_SEQ - Acknowledgement sequence number.

12 The base station shall set this field to the MSG\_SEQ field from  
13 the most recently received Access Channel message requiring  
14 an acknowledgement from the mobile station addressed by  
15 this order (see 7.6.3.1.1).

16 MSG\_SEQ - Message sequence number.

17 The base station shall set this field to the message sequence  
18 number for this order (see 7.6.2.1.4).



1	ACK_REQ	- Acknowledgement required indicator.
2		If the mobile station is to acknowledge this order, the base
3		station shall set this field to '1'. If the mobile station is not to
4		acknowledge this order, the base station shall set this field
5		to '0' (see 7.6.3.1.1).
6	VALID_ACK	- Valid acknowledgement indicator.
7		To acknowledge the most recently received Access Channel
8		message from the mobile station, the base station shall set
9		this field to '1'. If this order record does not acknowledge the
10		most recently received Access Channel message from the
11		mobile station, the base station shall set this field to '0'.
12	ADDR_TYPE	- Address type.
13		See 7.7.2.3.1.
14	ADDR_LEN	- Address field length.
15		See 7.7.2.3.1.
16	ADDRESS	- Mobile station address.
17		See 7.7.2.3.1.
18	ORDER	- Order code.
19		The base station shall set this field to the ORDER code
20		(see 7.7.4) for this type of order.
21	ADD_RECORD_LEN	- Additional record length.
22		The base station shall set this field to the number of octets in
23		the order-specific fields included in this order record.
24	order-specific fields	- Order-specific fields.
25		The base station shall include order-specific fields as specified
26		in 7.7.4 for this type of order.
27		
28	RESERVED	- Reserved bits.
29		The base station shall set this field to '00'.

1 7.7.2.3.2.8 Channel Assignment Message

- 2 When the base station sends a *Channel Assignment Message*, it shall use the following  
 3 variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001000')	8

One or more occurrences of the following record:

ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ADDR_TYPE	3
ADDR_LEN	4
ADDRESS	8 × ADDR_LEN
ASSIGN_MODE	3
ADD_RECORD_LEN	3

If ASSIGN\_MODE = '000', the record also includes the following fields:

FREQ_INCL	1
CODE_CHAN	8
CDMA_FREQ	0 or 11
FRAME_OFFSET	4
ENCRYPT_MODE	2
RESERVED	0 - 7 (as needed)

If ASSIGN\_MODE = '001', the record also includes the following fields:

RESPOND	1
FREQ_INCL	1
CDMA_FREQ	0 or 11

One or more occurrences of the following field:

PILOT_PN	9
----------	---

RESERVED	0 - 7 (as needed)
----------	-------------------

(continues on next page)

If ASSIGN\_MODE = '010', the record also includes the following fields:

RESPOND	1
RESERVED	7

If ASSIGN\_MODE = '011', the record also includes the following fields:

SID	15
VMAC	3
ANALOG_CHAN	11
SCC	2
MEM	1
AN_CHAN_TYPE	2
DSCC_MSB	1
RESERVED	5

RESERVED	0 - 7 (as needed)
----------	-------------------

**MSG\_TYPE** - Message type.

The base station shall set this field to '00001000'.

The base station shall include one or more occurrences of the following variable-length assignment record:

**ACK\_SEQ** - Acknowledgement sequence number.

The base station shall set this field to the MSG\_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this assignment (see 7.6.3.1.1).

**MSG\_SEQ** - Message sequence number.

The base station shall set this field to the message sequence number for this assignment (see 7.6.2.1.4).

**ACK\_REQ** - Acknowledgement required indicator.

If the mobile station is to acknowledge this message record, the base station shall set this field to '1'. If the mobile station is not to acknowledge this message record, the base station shall set this field to '0' (see 7.6.3.1.1).

- 1        **VALID\_ACK**    -    Valid acknowledgement indicator.
- 2                                To acknowledge the most recently received Access Channel
- 3                                message from the mobile station, the base station shall set
- 4                                this field to '1'. If this assignment record does not
- 5                                acknowledge the most recently received Access Channel
- 6                                message from the mobile station, the base station shall set
- 7                                this field to '0'.
- 8        **ADDR\_TYPE**    -    Address type.
- 9                                See 7.7.2.3.1.
- 10       **ADDR\_LEN**    -    Address field length.
- 11                                See 7.7.2.3.1.
- 12       **ADDRESS**    -    Mobile station address.
- 13                                See 7.7.2.3.1.
- 14       **ASSIGN\_MODE** -    Assignment mode.
- 15                                The base station shall set this field to the value shown in
- 16                                Table 7.7.2.3.2.8-1 corresponding to the assignment mode for
- 17                                this assignment.

Table 7.7.2.3.2.8-1. Assignment Mode

Value (binary)	Assignment Mode
000	Traffic Channel Assignment
001	Paging Channel Assignment
010	Acquire Analog System
011	Analog Voice Channel Assignment
All other values are reserved.	

- 20
- 21       **ADD\_RECORD\_LEN** -    Additional record length.
- 22                                The base station shall set this field to the number of octets in
- 23                                the fields included after this one in this assignment record.
- 24       If the **ASSIGN\_MODE** field is set to '000', the base station shall include the following five
- 25       fields in the assignment record:
- 26       **FREQ\_INCL**    -    Frequency included indicator.
- 27                                If the **CDMA\_FREQ** field is included in this assignment record,
- 28                                the base station shall set this bit to '1'. If the **CDMA\_FREQ**
- 29                                field is not included in this assignment record, the base
- 30                                station shall set this bit to '0'.

- 1        **CODE\_CHAN**    -    Code channel.
- 2                    The base station shall set this field to the code channel index
- 3                    (see 7.1.3.1.8) in the range 1 to 63 inclusive that the mobile
- 4                    station is to use on the Forward Traffic Channel.
- 5        **CDMA\_FREQ**    -    Frequency assignment.
- 6                    If the **FREQ\_INCL** bit is set to '1', the base station shall set
- 7                    this field to the CDMA Channel number corresponding to the
- 8                    CDMA frequency assignment for the CDMA Channel
- 9                    containing the Forward Traffic Channel the mobile station is
- 10                    to use. If the **FREQ\_INCL** bit is set to '0', the base station
- 11                    shall omit this field.
- 12        **FRAME\_OFFSET**    -    Frame offset.
- 13                    The Forward and Reverse Traffic Channel frames are delayed
- 14                    **FRAME\_OFFSET** × 1.25 ms relative to system timing (see
- 15                    7.1.3.5.1).
- 16                    The base station shall set this field to the Forward and
- 17                    Reverse Traffic Channel frame offset.
- 18        **ENCRYPT\_MODE**    -    Message encryption mode.
- 19                    The base station shall set this field to the **ENCRYPT\_MODE**
- 20                    value shown in Table 7.7.2.3.2.8-2 corresponding to the
- 21                    encrypting mode that is to be used for messages sent on the
- 22                    Forward and Reverse Traffic Channels, as specified
- 23                    in 6.3.12.2.

Table 7.7.2.3.2.8-2. Message Encryption Modes

<b>ENCRYPT_MODE</b> Field (binary)	Encryption Mode Used
00	Encryption disabled
01	Encrypt call control messages
All other <b>ENCRYPT_MODE</b> values are reserved.	

- 25
- 26        **RESERVED**    -    Reserved bits.
- 27                    The base station shall add reserved bits as needed in order to
- 28                    make the total length of the fields after the preceding
- 29                    **ADD\_RECORD\_LEN** field through this **RESERVED** field equal
- 30                    to an integer number of octets. The base station shall set
- 31                    these bits to '0'.
- 32
- 33

1 If the ASSIGN\_MODE field is set to '001', the base station shall include the following four  
2 fields in the assignment record:

- 3           RESPOND   - Respond on new Access Channel indicator.  
4                       If the mobile station is to retransmit an *Origination Message*  
5                       or *Page Response Message* after processing this channel  
6                       assignment, the base station shall set this field to '1'. The  
7                       base station may set this field to '0' only in response to a *Page*  
8                       *Response Message*.  
9           FREQ\_INCL   - Frequency included indicator.  
10                      If the CDMA\_FREQ field is included in this assignment record,  
11                      the base station shall set this bit to '1'. If the CDMA\_FREQ  
12                      field is not included in this assignment record, the base  
13                      station shall set this bit to '0'.  
14           CDMA\_FREQ   - Frequency assignment.  
15                      If the FREQ\_INCL bit is set to '1', the base station shall set  
16                      this field to the CDMA Channel number corresponding to the  
17                      CDMA frequency assignment for the CDMA Channel  
18                      containing the Paging Channel the mobile station is to use. If  
19                      the FREQ\_INCL bit is set to '0', the base station shall omit  
20                      this field.

21 The base station shall include one occurrence of the following field for each base station  
22 whose Paging Channel may be monitored by the mobile station. The base station may  
23 include one or more occurrences of this field.

- 24           PILOT\_PN    - Pilot PN sequence offset index.  
25                       The base station shall set this field to the pilot PN sequence  
26                       offset for a base station, in units of 64 PN chips. The base  
27                       station having this pilot PN sequence offset should support a  
28                       Primary Paging Channel with the same Paging Channel rate  
29                       as the current base station.  
30           RESERVED    - Reserved bits.  
31                       The base station shall add reserved bits as needed in order to  
32                       make the total length of the fields after the preceding  
33                       ADD\_RECORD\_LEN field through this RESERVED field equal  
34                       to an integer number of octets. The base station shall set  
35                       these bits to '0'.  
36

37 If the ASSIGN\_MODE field is set to '010', the base station shall include the following two  
38 fields in the assignment record:

- 39           RESPOND    - Respond on analog control channel indicator.  
40                       If the mobile station is to retransmit an *Origination Message*  
41                       or *Page Response Message* (see 2.7.1.1) on the analog control  
42                       channel after processing this channel assignment, the base  
43                       station shall set this field to '1'. The base station may set this  
44                       field to '0' only in response to a *Page Response Message*.

1	RESERVED	-	Reserved bits.
2			The base station shall set this field to '0000000'.
3			
4	If the ASSIGN_MODE field is set to '011', the base station shall include the following six		
5	fields in the assignment record:		
6	SID	-	System identification of the analog system.
7			The base station shall set this field to the system identification
8			of the analog system supporting the assigned voice channel
9			for this assignment (see 2.3.8).
10	VMAC	-	Voice mobile station attenuation code.
11			The base station shall set this field to the mobile station
12			power level associated with the assigned voice channel for this
13			assignment (see 2.1.2).
14	ANALOG_CHAN	-	Voice channel number.
15			The base station shall set this field to the voice channel
16			number for this assignment (see 2.1.1.1).
17	SCC	-	SAT color code. The base station shall set this field to the
18			supervisory audio tone associated with the assigned voice
19			channel. If the assignment is to a narrow analog channel, the
20			base station shall set this field to the two least significant bits
21			of the DSCC.
22	MEM	-	Message encryption mode indicator.
23			If analog control message encryption is to be enabled on the
24			assigned forward and reverse analog voice channels, the base
25			station shall set this bit to '1'. Otherwise, the base station
26			shall set this bit to '0'.
27	AN_CHAN_TYPE	-	Analog voice channel type.
28			The base station shall set this field to the analog channel type
29			as specified in Table 7.7.3.3.2.6-1. If the mobile station does
30			not have narrow analog capability the bits shall be set to '00'.
31	DSCC_MSB	-	Digital supervisory audio tone color code most significant bit.
32			The base station shall set this field to '0' when directing
33			handoff to a wide analog channel. The base station shall set
34			this field to the most significant bit of the DSCC when
35			directing handoff to a narrow analog channel.
36	RESERVED	-	Reserved bits.
37			The base station shall set this field to '00000'.
38			
39	RESERVED	-	Reserved bits.
40			The base station shall add reserved bits as needed in order to
41			make the length of the entire message equal to an integer
42			number of octets. The base station shall set these bits to '0'.

### 7.7.2.3.2.9 Data Burst Message

When the base station sends a *Data Burst Message* on the Paging Channel, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001001')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ADDR_TYPE	3
ADDR_LEN	4
ADDRESS	8 × ADDR_LEN
MSG_NUMBER	8
BURST_TYPE	6
NUM_MSGS	8
NUM_FIELDS	8
NUM_FIELDS occurrences of the following field:	
CHARi	8
RESERVED	5

MSG\_TYPE - Message type.

The base station shall set this field to '00001001'.

ACK\_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG\_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

MSG\_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.2.1.4).



1	ACK_REQ	- Acknowledgement required indicator.
2		If the mobile station is to acknowledge this message, the base
3		station shall set this field to '1'. If the mobile station is not to
4		acknowledge this message, the base station shall set this field
5		to '0' (see 7.6.3.1.1).
6	VALID_ACK	- Valid acknowledgement indicator.
7		To acknowledge the most recently received Access Channel
8		message from the mobile station, the base station shall set
9		this field to '1'. If this message does not acknowledge the
10		most recently received Access Channel message from the
11		mobile station, the base station shall set this field to '0'.
12	ADDR_TYPE	- Address type.
13		See 7.7.2.3.1.
14	ADDR_LEN	- Address field length.
15		See 7.7.2.3.1.
16	ADDRESS	- Mobile station address.
17		See 7.7.2.3.1.
18	MSG_NUMBER	- Message number.
19		The base station shall set this field to the number of this
20		message within the data burst stream.
21	BURST_TYPE	- Data burst type.
22		The base station shall set the value of this field for the type of
23		this data burst as defined in TSB58, <i>Administration of</i>
24		<i>Parameter Value Assignments for TIA/EIA Wideband Spread</i>
25		<i>Spectrum Standards</i> . If the base station sets this field equal to
26		'111111', it shall set the first two CHARi fields of this message
27		equal to the EXTENDED BURST TYPE as described in the
28		definition of CHARi below.
29	NUM_MSGS	- Number of messages in the data burst stream.
30		The base station shall set this field to the number of messages
31		in this data burst stream.
32	NUM_FIELDS	- Number of characters in this message.
33		The base station shall set this field to the number of
34		occurrences of the CHARi field included in this message.
35	CHARi	- Character.
36		The base station shall include NUM_FIELDS occurrences of
37		this field. The base station shall set these fields to the
38		corresponding octet of the data burst stream.

1 If the BURST TYPE field of this message is equal to '111111',  
2 the first two CHARi octets shall represent a single, 16 bit,  
3 EXTENDED BURST TYPE field, as shown below. The base  
4 station shall set the value of the EXTENDED BURST TYPE  
5 according to the type of this data burst as defined in TSB58,  
6 *Administration of Parameter Value Assignments for TIA/EIA*  
7 *Wideband Spread Spectrum Standards.*  
8

Field	Length (bits)
EXTENDED_BURST_TYPE (first two CHARi fields)	16
Remaining CHARi fields	8 x (NUM_FIELDS - 2)

9  
10 RESERVED - Reserved bits.

11 The base station shall set this field to '00000'.

### 7.7.2.3.2.10 Authentication Challenge Message

When the base station sends an *Authentication Challenge Message* on the Paging Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00001010')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ADDR_TYPE	3
ADDR_LEN	4
ADDRESS	8 × ADDR_LEN
RANDU	24
RESERVED	3

**MSG\_TYPE** - Message type.

The base station shall set this field to '00001010'.

**ACK\_SEQ** - Acknowledgement sequence number.

The base station shall set this field to the MSG\_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

**MSG\_SEQ** - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.2.1.4).

**ACK\_REQ** - Acknowledgement required indicator.

If the mobile station is to acknowledge this message, the base station shall set this field to '1'. If the mobile station is not to acknowledge this message, the base station shall set this field to '0' (see 7.6.3.1.1).

**VALID\_ACK** - Valid acknowledgement indicator.

To acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '1'. If this message does not acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '0'.

1	ADDR_TYPE	-	Address type.
2			See 7.7.2.3.1.
3	ADDR_LEN	-	Address field length.
4			See 7.7.2.3.1.
5	ADDRESS	-	Mobile station address.
6			See 7.7.2.3.1.
7	RANDU	-	Random challenge data.
8			The base station shall set this field to the random challenge
9			data (see 6.3.12.1.5).
10	RESERVED	-	Reserved bits.
11			The base station shall set this field to '000'.

#### 7.7.2.3.2.11 SSD Update Message

When the base station sends an *SSD Update Message* on the Paging Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00001011')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ADDR_TYPE	3
ADDR_LEN	4
ADDRESS	8 × ADDR_LEN
RANDSSD	56
RESERVED	3

MSG\_TYPE - Message type.

The base station shall set this field to '00001011'.

ACK\_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG\_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

MSG\_SEQ - Message sequence number.

The base station shall set this field to the acknowledgement sequence number for this message (see 7.6.2.1.4).

ACK\_REQ - Acknowledgement required indicator.

If the mobile station is to acknowledge this message, the base station shall set this field to '1'. If the mobile station is not to acknowledge this message, the base station shall set this field to '0' (see 7.6.3.1.1).

VALID\_ACK - Valid acknowledgement indicator.

To acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '1'. If this message does not acknowledge the most recently received Access Channel message from the mobile station, the base station shall set this field to '0'.

1	ADDR_TYPE	-	Address type. See 7.7.2.3.1.
2			
3	ADDR_LEN	-	Address field length. See 7.7.2.3.1.
4			
5	ADDRESS	-	Mobile station address. See 7.7.2.3.1.
6			
7	RANDSSD	-	Random data for the computation of SSD. The base station shall set this field as specified in 6.3.12.1.9.
8			
9			
10	RESERVED	-	Reserved bits. The base station shall set this field to '000'.
11			

### 7.7.2.3.2.12 Feature Notification Message

When the base station sends a *Feature Notification Message* on the Paging Channel, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001100')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ADDR_TYPE	3
ADDR_LEN	4
ADDRESS	8 × ADDR_LEN
RELEASE	1

One or more occurrences of the following record:

RECORD_TYPE	8
RECORD_LEN	8
Type-specific fields	8 × RECORD_LEN

RESERVED	2
----------	---

MSG\_TYPE - Message type.

The base station shall set this field to '00001100'.

ACK\_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG\_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

MSG\_SEQ - Message sequence number.

The base station shall set this field to the acknowledgement sequence number for this message (see 7.6.2.1.4).

ACK\_REQ - Acknowledgement required indicator.

If the mobile station is to acknowledge this message, the base station shall set this field to '1'. If the mobile station is not to acknowledge this message, the base station shall set this field to '0' (see 7.6.3.1.1).

1	VALID_ACK	- Valid acknowledgement indicator.
2		To acknowledge the most recently received Access Channel
3		message from the mobile station, the base station shall set
4		this field to '1'. If this message does not acknowledge the
5		most recently received Access Channel message from the
6		mobile station, the base station shall set this field to '0'.
7	ADDR_TYPE	- Address type.
8		See 7.7.2.3.1.
9	ADDR_LEN	- Address field length.
10		See 7.7.2.3.1.
11	ADDRESS	- Mobile station address.
12		See 7.7.2.3.1.
13	RELEASE	- Origination completion indicator.
14		The base station shall set this field to '1' if this message is
15		used to complete an origination request from the mobile
16		station. Otherwise the base station shall set this field to '0'.
17	The base station shall include occurrences of the following three-field record as specified in	
18	7.7.5.	
19	RECORD_TYPE	- Information record type.
20		The base station shall set this field as specified in 7.7.5.
21	RECORD_LEN	- Information record length.
22		The base station shall set this field to the number of octets in
23		the type-specific fields included in this record.
24	type-specific fields	- Type-specific fields.
25		The base station shall include type-specific fields as specified
26		in 7.7.5.
27		
28	RESERVED	- Reserved bits.
29		The base station shall set this field to '00'.



1 7.7.2.3.2.13 Extended System Parameters Message

2 When the base station sends an *Extended System Parameters Message*, it shall use the  
 3 following variable-length message format:

Field	Length (bits)
MSG_TYPE (00001101)	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
RESERVED	2
PREF_MSID_TYPE	2
MCC	10
IMSI_11_12	7
RESERVED_LEN	4
RESERVED_OCTETS	8 × RESERVED_LEN
BCAST_INDEX	3
RESERVED	7

- 4
- 5 MSG\_TYPE - Message type.
- 6 The base station shall set this field to '00001101'.
- 7 PILOT\_PN - Pilot PN sequence offset index.
- 8 The base station shall set this field to the pilot PN sequence
- 9 offset for this base station, in units of 64 PN chips.
- 10 CONFIG\_MSG\_SEQ - Configuration message sequence number.
- 11 The base station shall set this field to CONFIG\_SEQ
- 12 (see 7.6.2.2).
- 13 RESERVED - Reserved bits.
- 14 The base station shall set this field to '00'.
- 15 PREF\_MSID\_TYPE - Preferred Access Channel Mobile Station Identifier Type.
- 16 The base station shall set this field to the value shown in
- 17 Table 7.7.2.3.2.13-1 corresponding to the type of MSID that
- 18 the mobile station is to use on the Access Channel.
- 19

Table 7.7.2.3.2.13-1. Preferred MSID Types

Description	Preferred MSID (binary)
IMSI_S and ESN	00
IMSI	10
IMSI and ESN	11
All other values are reserved	

2		
3	MCC	- Mobile country code.
4		The base station shall set this field to the MCC (see 6.3.1)
5	IMSI_11_12	- 11th and 12th digits of the IMSI.
6		The base station shall set this field to the IMSI_11_12 (see
7		6.3.1).
8	RESERVED_LEN	- Reserved octets length.
9		The base station shall set this field to the number of octets
10		included in the RESERVED_OCTETS.
11	RESERVED_OCTETS	- Reserved octets.
12		The base station shall set each octet in this field to
13		'00000000'.
14	BCAST_INDEX	- Broadcast slot cycle index.
15		To enable periodic broadcast paging, the base station shall set
16		this field to an unsigned 3-bit number in the range 1-7, equal
17		to the broadcast slot cycle index as defined in 2.4.1.2.2.1 of
18		TIA/EIA/IS-637. To disable periodic broadcast paging, the
19		base station shall set this field to '000'.
20	RESERVED	- Reserved bits.
21		The base station shall set this field to '000000'.
22		

- 1 7.7.2.3.2.14 Reserved
- 2 7.7.2.3.2.15 Reserved

## 7.7.2.3.2.16 Service Redirection Message

When the base station sends a *Service Redirection Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00010000')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
VALID_ACK	1
ADDR_TYPE	3
ADDR_LEN	4
ADDRESS	8 × ADDR_LEN
RETURN_IF_FAIL	1
RESERVED	2

One occurrence of the following record:

RECORD_TYPE	8
RECORD_LEN	8
Type-specific fields	8 × RECORD_LEN

MSG\_TYPE - Message type.

The base station shall set this field to '00010000'.

ACK\_SEQ - Acknowledgement sequence number.

The base station shall set this field to the MSG\_SEQ field from the most recently received Access Channel message requiring an acknowledgement from the mobile station addressed by this message (see 7.6.3.1.1).

MSG\_SEQ - Message sequence number.

The base station shall set this field to the acknowledgement sequence number for this message (see 7.6.2.1.4).

1	ACK_REQ	-	Acknowledgment required indicator.
2			If the mobile station is to acknowledge this message, the base
3			station shall set this field to '1'. If the mobile station is not to
4			acknowledge this message, the base station shall set this field
5			to '0' (see 7.6.3.1.1).
6	VALID_ACK	-	Valid acknowledgement indicator.
7			To acknowledge the most recently received Access Channel
8			message from the mobile station, the base station shall set
9			this field to '1'. If this message does not acknowledge the
10			most recently received Access Channel message from the
11			mobile station, the base station shall set this field to '0'.
12	ADDR_TYPE	-	Address type.
13			See 7.7.2.3.1.
14	ADDR_LEN	-	Address field length.
15			See 7.7.2.3.1.
16	ADDRESS	-	Mobile station address.
17			See 7.7.2.3.1.
18	RETURN_IF_FAIL	-	Return if fail indicator.
19			The base station shall set this field to '1' if the mobile station
20			is required to return to the system from which it is being
21			redirected upon failure to obtain service using the redirection
22			criteria specified in this message. Otherwise, the base station
23			shall set this field to '0'.
24	RESERVED	-	Reserved bits.
25			The base station shall set this field to '00'.
26	The base station shall include one occurrence of the following three-field record:		
27	RECORD_TYPE	-	Redirection record type.
28			The base station shall set this field to the RECORD_TYPE
29			value shown in Table 7.7.2.3.2.16-1 corresponding to the type
30			of redirection specified by this record.
31			

Table 7.7.2.3.2.16-1. Redirection Record Types

Description	RECORD_TYPE (binary)
Redirection to an analog system as defined in EIA/TIA-553, EIA/TIA/IS-54, TIA/EIA/IS-91, and TIA/EIA/IS-95.	00000001
Redirection to a CDMA system as defined in TIA/EIA/IS-95	00000010
All other RECORD_TYPE values are reserved	

RECORD\_LEN - Redirection record length.

The base station shall set this field to the number of octets in the type-specific fields of this redirection record.

Type-specific fields - Redirection record type-specific fields.

The base station shall include type-specific fields based on the RECORD\_TYPE of this redirection record.

If RECORD\_TYPE is equal to '00000001', the base station shall include the following fields:

Field	Length (bits)
EXPECTED_SID	15
IGNORE_CDMA	1
SYS_ORDERING	3
RESERVED	5

EXPECTED\_SID - Expected SID.

If the base station is redirecting the mobile station to a specific system, the base station shall set this field to the SID of that system. Otherwise, the base station shall set this field to 0.

IGNORE\_CDMA - Ignore CDMA Available indicator.

The base station shall set this field to '1' to indicate that the mobile station is to ignore the *CDMA Capability Message* on the analog system to which it is being redirected. The base station shall set this field to '0' to indicate that the mobile station may discontinue service on the system to which it is being redirected if the mobile station receives a *CDMA Capability Message* with CDMA\_AVAIL equal to '1', and the preferred mode of the mobile station is CDMA.

**SYS\_ORDERING** - System ordering.

The base station shall set this field to the SYS\_ORDERING value shown in Table 7.7.2.3.2.16-2 corresponding to the order in which the mobile station is to attempt to obtain service on an analog system.

**Table 7.7.2.3.2.16-2. SYS\_ORDERING**

Description	SYS_ORDERING (binary)
Attempt to obtain service on either System A or B in accordance with the custom system selection process (see 6.6.1.1.1).	000
Attempt to obtain service on System A only.	001
Attempt to obtain service on System B only.	010
Attempt to obtain service on System A first. If unsuccessful, attempt to obtain service on System B.	011
Attempt to obtain service on System B first. If unsuccessful, attempt to obtain service on System A.	100
Attempt to obtain service on either System A or System B. If unsuccessful, attempt to obtain service on the alternate system (System A or System B).	101
All other SYS_ORDERING values are reserved	

**RESERVED** - Reserved bits.

The base station shall set this field to '00000'.

1 If RECORD\_TYPE is equal to '00000010', the base station shall include the following fields:

Subfield	Length (bits)
BAND_CLASS	5
EXPECTED_SID	15
EXPECTED_NID	16
RESERVED	4
NUM_CHANS	4

NUM\_CHANS occurrences of the following field:

CDMA_CHAN	11
-----------	----

RESERVED	0-7 (as needed)
----------	-----------------

3  
4 BAND\_CLASS - Band class.

5 The base station shall set this field to the value shown in  
6 TSB58 corresponding to the frequency band to which the  
7 mobile station is being redirected.

8 EXPECTED\_SID - Expected SID.

9 If the base station is redirecting the mobile station to a  
10 specific system, the base station shall set this field to the SID  
11 of that system. Otherwise, the base station shall set this field  
12 to 0.

13 EXPECTED\_NID - Expected NID.

14 If the base station is redirecting the mobile station to a  
15 specific network, the base station shall set this field to the  
16 NID of that network. Otherwise, the base station shall set this  
17 field to 65535.

18 RESERVED - Reserved bits.

19 The base station shall set this field to '0000'.

20 NUM\_CHANS - Number of CDMA Channels.

21 The base station shall set this field to the number of  
22 occurrences of the CDMA\_CHAN field in this record.

23 CDMA\_CHAN - CDMA Channel number.

24 For each CDMA Channel on which the mobile station is to  
25 attempt to acquire a CDMA system, the base station shall  
26 include one occurrence of this field specifying the associated  
27 CDMA Channel number.



1        **RESERVED**    -    Reserved bits.  
2                      The base station shall add reserved bits as needed in order to  
3                      make the length of the record equal to an integer number of  
4                      octets. The base station shall set these bits to '0'.

### 7.7.2.3.2.17 General Page Message

When the base station sends a *General Page Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00010001')	8
CONFIG_MSG_SEQ	6
ACC_MSG_SEQ	6
CLASS_0_DONE	1
CLASS_1_DONE	1
RESERVED	2
BROADCAST_DONE	1
RESERVED	4
ADD_LENGTH	3
ADD_PFIELD	8 × ADD_LENGTH

Zero or more occurrences of the following page record:

PAGE_CLASS	2
PAGE_SUBCLASS	2
Page class specific fields	see Table 7.7.2.3.2.17-1

RESERVED	0 - 7 (as needed)
----------	-------------------

- MSG\_TYPE - Message type.  
The base station shall set this field to '00010001'.
- CONFIG\_MSG\_SEQ - Configuration message sequence number.  
The base station shall set this field to CONFIG\_SEQ (see 7.6.2.2).
- ACC\_MSG\_SEQ - Access parameters message sequence number.  
The base station shall set this field to ACC\_CONFIG\_SEQ (see 7.6.2.2).

1	CLASS_0_DONE	- Class 0 pages are done.
2		If all messages and records directed to mobile stations
3		operating in the slotted mode, active in this slot, and having
4		an assigned class 0 IMSI have been sent by the end of this
5		<i>General Page Message</i> , the base station shall set this field to
6		'1'. Otherwise, the base station shall set this field to '0'.
7	CLASS_1_DONE	- Class 1 pages are done.
8		If all messages and records directed to mobile stations
9		operating in the slotted mode, active in this slot, and having
10		an assigned class 1 IMSI have been sent by the end of this
11		<i>General Page Message</i> , the base station shall set this field to
12		'1'. Otherwise, the base station shall set this field to '0'.
13	RESERVED	- Reserved bits.
14		The base station shall set this field to '00'.
15	BROADCAST_DONE	- Broadcast pages are done.
16		If all broadcast page records (PAGE_CLASS equal to '11') have
17		been sent by the end of this <i>General Page Message</i> , the base
18		station shall set this field to '1'. Otherwise, the base station
19		shall set this field to '0'.
20	RESERVED	- Reserved bits.
21		The base station shall set this field to '0000'.
22	ADD_LENGTH	- Number of octets in the page message specific fields.
23		If there are no additional page message specific fields, the
24		base station shall set this field to '000'.
25	ADD_PFIELD	- Additional page message specific fields.
26		The base station shall not include any additional page
27		message specific fields, if ADD_LENGTH is '000'.
28	The base station shall include one occurrence of the appropriate page class record for each	
29	mobile station which is paged in this message (see Table 7.7.2.3.2.17-1). The base station	
30	shall use the procedures in 7.6.2.1.5.1 to select the class of page record.	
31	Page records with the PAGE_CLASS set equal to '00' are used to page mobile stations that	
32	have been assigned a class 0 IMSI (see 7.6.2.1.5.1). Page records with the PAGE_CLASS set	
33	equal to '01' are used to page mobile stations that have been assigned a class 1 IMSI. Page	
34	records with the PAGE_CLASS set equal to '11' and PAGE_SUBCLASS set equal to '00' are	
35	used to announce broadcast messages sent on the Paging Channel (see 2.4.2.3 of	
36	TIA/EIA/IS-637).	
37		

Table 7.7.2.3.2.17-1. Page Record Formats

Description	PAGE _CLASS (binary)	PAGE _SUBCLASS (binary)	Page Record Format Number
Class 0, IMSI_S included	00	00	0
Class 0, IMSI_S and IMSI_11_12 included	00	01	1
Class 0, IMSI_S and MCC included	00	10	2
Class 0, IMSI_S, IMSI_11_12, and MCC included	00	11	3
Class 1, IMSI_S and IMSI_11_12 included	01	00	4
Class 1, IMSI_S, IMSI_11_12, and MCC included	01	01	5
Class 3, Broadcast	11	00	12

If PAGE\_CLASS = '00' and PAGE\_SUBCLASS = '00' (page record format is equal to 0), then the base station shall use the following page class specific fields:

Field	Length (bits)
MSG_SEQ	3
IMSI_S	34
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

If PAGE\_CLASS = '00' and PAGE\_SUBCLASS = '01' (page record format is equal to 1), then the base station shall use the following page class specific fields:

Field	Length (bits)
MSG_SEQ	3
IMSI_11_12	7
IMSI_S	34
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

If PAGE\_CLASS = '00' and PAGE\_SUBCLASS = '10' (page record format is equal to 2), then the base station shall use the following page class specific fields:

Field	Length (bits)
MSG_SEQ	3
MCC	10
IMSI_S	34
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

If PAGE\_CLASS = '00' and PAGE\_SUBCLASS = '11' (page record format is equal to 3), then the base station shall use the following page class specific fields:

Field	Length (bits)
MSG_SEQ	3
MCC	10
IMSI_11_12	7
IMSI_S	34
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

If PAGE\_CLASS = '01' and PAGE\_SUBCLASS = '00' (page record format is equal to 4), then the base station shall use the following page class specific fields:

Field	Length (bits)
MSG_SEQ	3
IMSI_ADDR_NUM	3
IMSI_11_12	7
IMSI_S	34
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

If PAGE\_CLASS = '01' and PAGE\_SUBCLASS = '01' (page record format is equal to 5), then the base station shall use the following page class specific fields:

Field	Length (bits)
MSG_SEQ	3
IMSI_ADDR_NUM	3
MCC	10
IMSI_11_12	7
IMSI_S	34
SPECIAL_SERVICE	1
SERVICE_OPTION	0 or 16

If PAGE\_CLASS = '11' and PAGE\_SUBCLASS = '00' (page record format is equal to 12), then the base station shall use the following page class specific fields:

Field	Length (bits)
BURST_TYPE	6
ADDR_LEN	4
BC_ADDR	8xADDR_LEN

If PAGE\_CLASS is equal to '00' and PAGE\_SUBCLASS is equal to '00' (page record format is equal to 0), the base station shall include the following fields in the page class specific field:

MSG\_SEQ - Message sequence number.

The base station shall set this field to the message sequence number for this message (see 7.6.2.1.4).

- 1                   IMSI\_S   - Last ten digits of the IMSI.  
 2                               The base station shall set this field to IMSI\_S. See 6.3.1.  
 3       SPECIAL\_SERVICE   - Special service option indicator.  
 4                               To request a special service option, the base station shall set  
 5                               this field to '1'. To request the default service option (Service  
 6                               Option 1), the base station shall set this field to '0'.  
 7       SERVICE\_OPTION   - Service option.  
 8                               If the SPECIAL\_SERVICE field is set to '1', the base station  
 9                               shall set this field to the service option code shown in TSB58,  
 10                              *Administration of Parameter Value Assignments for TIA/EIA*  
 11                              *Wideband Spread Spectrum Standards*, corresponding to the  
 12                              requested service option. If the SPECIAL\_SERVICE field is set  
 13                              to '0', the base station shall omit this field.

14  
 15 If PAGE\_CLASS is equal to '00' and PAGE\_SUBCLASS is equal to '01' (page record format is  
 16 equal to 1), the base station shall include the following fields in the page class specific field:

- 17                   MSG\_SEQ   - Message sequence number.  
 18                               The base station shall set this field to the message sequence  
 19                               number for this message (see 7.6.2.1.4).  
 20       IMSI\_11\_12   - The 11th and 12th digits of IMSI.  
 21                               The base station shall set this field to IMSI\_11\_12. See 6.3.1.  
 22       IMSI\_S       - Last ten digits of the IMSI.  
 23                               The base station shall set this field to IMSI\_S. See 6.3.1.  
 24       SPECIAL\_SERVICE   - Special service option indicator.  
 25                               To request a special service option, the base station shall set  
 26                               this field to '1'. To request the default service option (Service  
 27                               Option 1), the base station shall set this field to '0'.  
 28       SERVICE\_OPTION   - Service option.  
 29                               If the SPECIAL\_SERVICE field is set to '1', the base station  
 30                               shall set this field to the service option code shown in TSB58,  
 31                              *Administration of Parameter Value Assignments for TIA/EIA*  
 32                              *Wideband Spread Spectrum Standards*, corresponding to the  
 33                              requested service option. If the SPECIAL\_SERVICE field is set  
 34                              to '0', the base station shall omit this field.

35  
 36 If PAGE\_CLASS is equal to '00' and PAGE\_SUBCLASS is equal to '10' (page record format is  
 37 equal to 2), the base station shall include the following fields in the page class specific field:

- 38                   MSG\_SEQ   - Message sequence number.  
 39                               The base station shall set this field to the message sequence  
 40                               number for this message (see 7.6.2.1.4).

1	MCC	- Mobile country code.
2		The base station shall set this field to the MCC. See 6.3.1.
3	IMSI_S	- Last ten digits of the IMSI.
4		The base station shall set this field to IMSI_S. See 6.3.1.
5	SPECIAL_SERVICE	- Special service option indicator.
6		To request a special service option, the base station shall set
7		this field to '1'. To request the default service option (Service
8		Option 1), the base station shall set this field to '0'.
9	SERVICE_OPTION	- Service option.
10		If the SPECIAL_SERVICE field is set to '1', the base station
11		shall set this field to the service option code shown in TSB58,
12		<i>Administration of Parameter Value Assignments for TIA/EIA</i>
13		<i>Wideband Spread Spectrum Standards</i> , corresponding to the
14		requested service option. If the SPECIAL_SERVICE field is set
15		to '0', the base station shall omit this field.
16		
17	If PAGE_CLASS is equal to '00' and PAGE_SUBCLASS is equal to '11' (page record format is	
18	equal to 3), the base station shall include the following fields in the page class specific field:	
19	MSG_SEQ	- Message sequence number.
20		The base station shall set this field to the message sequence
21		number for this message (see 7.6.2.1.4).
22	MCC	- Mobile country code.
23		The base station shall set this field to the MCC. See 6.3.1.
24	IMSI_11_12	- The 11th and 12th digits of IMSI.
25		The base station shall set this field to IMSI_11_12. See 6.3.1.
26	IMSI_S	- Last ten digits of the IMSI.
27		The base station shall set this field to IMSI_S. See 6.3.1.
28	SPECIAL_SERVICE	- Special service option indicator.
29		To request a special service option, the base station shall set
30		this field to '1'. To request the default service option (Service
31		Option 1), the base station shall set this field to '0'.
32	SERVICE_OPTION	- Service option.
33		If the SPECIAL_SERVICE field is set to '1', the base station
34		shall set this field to the service option code shown in TSB58,
35		<i>Administration of Parameter Value Assignments for TIA/EIA</i>
36		<i>Wideband Spread Spectrum Standards</i> , corresponding to the
37		requested service option. If the SPECIAL_SERVICE field is set
38		to '0', the base station shall omit this field.
39		



If PAGE\_CLASS is equal to '01' and PAGE\_SUBCLASS is equal to '00' (page record format is equal to 4), the base station shall include the following fields in the page class specific field:

- MSG\_SEQ - Message sequence number.  
The base station shall set this field to the message sequence number for this message (see 7.6.2.1.4).
- IMSI\_ADDR\_NUM - Number of IMSI address digits.  
The base station shall set this field according to the number of digits in the NMSI minus four.
- IMSI\_11\_12 - The 11th and 12th digits of IMSI.  
The base station shall set this field to IMSI\_11\_12. See 6.3.1.
- IMSI\_S - Last ten digits of the IMSI.  
The base station shall set this field to IMSI\_S. See 6.3.1.
- SPECIAL\_SERVICE - Special service option indicator.  
To request a special service option, the base station shall set this field to '1'. To request the default service option (Service Option 1), the base station shall set this field to '0'.
- SERVICE\_OPTION - Service option.  
If the SPECIAL\_SERVICE field is set to '1', the base station shall set this field to the service option code shown in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*, corresponding to the requested service option. If the SPECIAL\_SERVICE field is set to '0', the base station shall omit this field.

If PAGE\_CLASS is equal to '01' and PAGE\_SUBCLASS is equal to '01' (page record format is equal to 5), the base station shall include the following fields in the page class specific field:

- MSG\_SEQ - Message sequence number.  
The base station shall set this field to the message sequence number for this message (see 7.6.2.1.4).
- IMSI\_ADDR\_NUM - Number of IMSI address digits.  
The base station shall set this field according to the number of digits in the NMSI minus four.
- MCC - Mobile country code.  
The base station shall set this field to the MCC. See 6.3.1.
- IMSI\_11\_12 - The 11th and 12th digits of IMSI.  
The base station shall set this field to IMSI\_11\_12. See 6.3.1.
- IMSI\_S - Last ten digits of the IMSI.  
The base station shall set this field to IMSI\_S. See 6.3.1.

- 1        **SPECIAL\_SERVICE**   -   Special service option indicator.
- 2                                To request a special service option, the base station shall set
- 3                                this field to '1'. To request the default service option (Service
- 4                                Option 1), the base station shall set this field to '0'.
- 5        **SERVICE\_OPTION**   -   Service option.
- 6                                If the **SPECIAL\_SERVICE** field is set to '1', the base station
- 7                                shall set this field to the service option code shown in TSB58,
- 8                                *Administration of Parameter Value Assignments for TIA/EIA*
- 9                                *Wideband Spread Spectrum Standards*, corresponding to the
- 10                                requested service option. If the **SPECIAL\_SERVICE** field is set
- 11                                to '0', the base station shall omit this field.
- 12
- 13        If **PAGE\_CLASS** is equal to '11' and **PAGE\_SUBCLASS** is equal to '00' (page record format is
- 14        equal to 12), the base station shall include the following fields in the page class specific
- 15        field:
- 16                **BURST\_TYPE**   -   Data burst type.
- 17                                The base station shall set this field to the value shown in
- 18                                TSB58, *Administration of Parameter Value Assignments for*
- 19                                *TIA/EIA Wideband Spread Spectrum Standards*, for the type of
- 20                                the broadcast *Data Burst Message* being announced.
- 21                **ADDR\_LEN**   -   Address field length.
- 22                                The base station shall set this field to the number of octets in
- 23                                the **BC\_ADDR** field.
- 24                **BC\_ADDR**   -   Broadcast address.
- 25                                The base station shall set this field according to the
- 26                                requirements applicable to the burst type of the *Data Burst*
- 27                                *Message* being announced.
- 28

1 7.7.2.3.2.18 Global Service Redirection Message

2 When the base station sends a *Global Service Redirection Message*, it shall use the following  
 3 variable-length message format:

4

Field	Length (bits)
MSG_TYPE (00010010)	8
PILOT_PN	9
CONFIG_MSG_SEQ	6
REDIRECT_ACCOLC	16
RETURN_IF_FAIL	1
RESERVED	2

One occurrence of the following record:

RECORD_TYPE	8
RECORD_LEN	8
Type-specific fields	8 × RECORD_LEN

- 5
- 6 MSG\_TYPE - Message type.
- 7 The base station shall set this field to '00010010'.
- 8 PILOT\_PN - Pilot PN sequence offset index.
- 9 The base station shall set this field to the pilot PN sequence
- 10 offset for this base station, in units of 64 PN chips.
- 11 CONFIG\_MSG\_SEQ - Configuration message sequence number.
- 12 The base station shall set this field to CONFIG\_SEQ
- 13 (see 7.6.2.2).
- 14 REDIRECT\_ACCOLC - Redirected access overload classes.
- 15 This field consists of the following subfields:
- 16

Subfield	Length (bits)	Subfield Description
ACCOLC_0	1	Access overload class 0
ACCOLC_1	1	Access overload class 1
ACCOLC_2	1	Access overload class 2
ACCOLC_3	1	Access overload class 3
ACCOLC_4	1	Access overload class 4
ACCOLC_5	1	Access overload class 5
ACCOLC_6	1	Access overload class 6
ACCOLC_7	1	Access overload class 7
ACCOLC_8	1	Access overload class 8
ACCOLC_9	1	Access overload class 9
ACCOLC_10	1	Access overload class 10
ACCOLC_11	1	Access overload class 11
ACCOLC_12	1	Access overload class 12
ACCOLC_13	1	Access overload class 13
ACCOLC_14	1	Access overload class 14
ACCOLC_15	1	Access overload class 15

- 1
- 2
- 3
- 4
- 5 The base station shall set the subfields corresponding to the
- 6 access overload classes of mobile stations which are to be
- 7 redirected to '1', and shall set the remaining subfields to '0'.
- 8
- 9
- 10
- 11 RETURN\_IF\_FAIL - Return if fail indicator.
- 12
- 13 The base station shall set this field to '1' if the mobile station
- 14 is required to return to the system from which it is being
- 15 redirected upon failure to obtain service using the redirection
- 16 criteria specified in this message. Otherwise, the base station
- 17 shall set this field to '0'.
- 18
- 19 RESERVED - Reserved bits.
- 20
- 21 The base station shall set this field to '00'.
- 22
- 23 The base station shall include one occurrence of the following three-field record:
- 24
- 25 RECORD\_TYPE - Redirection record type.
- 26
- 27 The base station shall set this field to the RECORD\_TYPE
- 28 value shown in Table 7.7.2.3.2.16-1 corresponding to the type
- 29 of redirection specified by this record.
- 30
- 31 RECORD\_LEN - Redirection record length.
- 32
- 33 The base station shall set this field to the number of octets in
- 34 the type-specific fields of this redirection record.

Type-specific fields - Redirection record type-specific fields.

The base station shall include type-specific fields based on the RECORD\_TYPE of this redirection record.

If RECORD\_TYPE is equal to '00000001', the base station shall include the following fields:

Field	Length (bits)
EXPECTED_SID	15
IGNORE_CDMA	1
SYS_ORDERING	3
RESERVED	5

EXPECTED\_SID - Expected SID.

If the base station is redirecting the mobile station to a specific system, the base station shall set this field to the SID of that system. Otherwise, the base station shall set this field to 0.

IGNORE\_CDMA - Ignore CDMA Available indicator.

The base station shall set this field to '1' to indicate that the mobile station is to ignore the *CDMA Capability Message* on the analog system to which it is being redirected. The base station shall set this field to '0' to indicate that the mobile station may discontinue service on the system to which it is being redirected if the mobile station receives a *CDMA Capability Message* with CDMA\_AVAIL equal to '1', and the preferred mode of the mobile station is CDMA.

SYS\_ORDERING - System ordering.

The base station shall set this field to the SYS\_ORDERING value shown in Table 7.7.2.3.2.16-2 corresponding to the order in which the mobile station is to attempt to obtain service on an analog system.

RESERVED - Reserved bits.

The base station shall set this field to '00000'.

1 If RECORD\_TYPE is equal to '00000010', the base station shall include the following fields:

Subfield	Length (bits)
BAND_CLASS	5
EXPECTED_SID	15
EXPECTED_NID	16
RESERVED	4
NUM_CHANS	4

NUM\_CHANS occurrences of the following field:

CDMA_CHAN	11
-----------	----

RESERVED	0-7 (as needed)
----------	-----------------

- 3
- 4 **BAND\_CLASS** - Band class.
- 5 The base station shall set this field to the value shown in
- 6 TSB58 corresponding to the frequency band to which the
- 7 mobile station is being redirected.
- 8 **EXPECTED\_SID** - Expected SID.
- 9 If the base station is redirecting the mobile station to a
- 10 specific system, the base station shall set this field to the SID
- 11 of that system. Otherwise, the base station shall set this field
- 12 to 0.
- 13 **EXPECTED\_NID** - Expected NID.
- 14 If the base station is redirecting the mobile station to a
- 15 specific network, the base station shall set this field to the
- 16 NID of that network. Otherwise, the base station shall set this
- 17 field to 65535.
- 18 **RESERVED** - Reserved bits.
- 19 The base station shall set this field to '0000'.
- 20 **NUM\_CHANS** - Number of CDMA Channels.
- 21 The base station shall set this field to the number of
- 22 occurrences of the CDMA\_CHAN field in this record.
- 23 **CDMA\_CHAN** - CDMA Channel number.
- 24 For each CDMA Channel on which the mobile station is to
- 25 attempt to acquire a CDMA system, the base station shall
- 26 include one occurrence of this field specifying the associated
- 27 CDMA Channel number.

1        **RESERVED**    -    Reserved bits.  
2                      The base station shall add reserved bits as needed in order to  
3                      make the length of the record equal to an integer number of  
4                      octets. The base station shall set these bits to '0'.

## 1 7.7.2.3.2.19 Null Message

2 When the base station sends a *Null Message*, it shall use the following fixed-length message  
3 format:

Field	Length (bits)
RESERVED	2

5

6

RESERVED - Reserved bits.

7

The base station shall set this field to '00'.



### 7.7.3 Forward Traffic Channel

During Traffic Channel operation, the base station sends signaling messages to the mobile station using the Forward Traffic Channel.

#### 7.7.3.1 Forward Traffic Channel Structure

When sending a Forward Traffic Channel message, the base station shall send it as signaling traffic using the signaling traffic formats specified in 7.1.3.5.11. The base station may use one or more Forward Traffic Channel frames to send the message.

The first signaling traffic bit in a Forward Traffic Channel frame shall be a Start of Message (SOM) Bit. The base station shall set this bit to '1' if a Forward Traffic Channel message begins in the frame, or to '0' if the frame contains bits of a Forward Traffic Channel message that began in a previous frame. The base station shall use the remaining signaling traffic bits of the frame to send Forward Traffic Channel message bits. If the frame used to send the last bits of a message contains any unused signaling traffic bits, the base station shall set each of these bits, referred to as padding bits, to '0'.

#### 7.7.3.2 Forward Traffic Channel Message Structure

A Forward Traffic Channel message shall consist of a length field (MSG\_LENGTH), a message body, and a CRC field, in that order (see Figure 7.7.3.2-1).

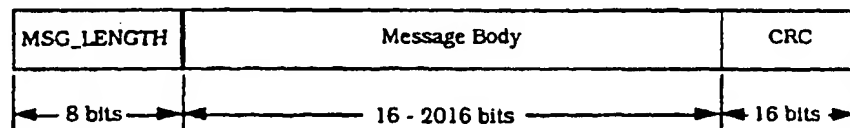


Figure 7.7.3.2-1. Forward Traffic Channel Message Structure

##### 7.7.3.2.1 Forward Traffic Channel Message MSG\_LENGTH Field

The base station shall set the MSG\_LENGTH field of a Forward Traffic Channel message to the length, in octets, of the message, including the MSG\_LENGTH field, the message body and the CRC field. The MSG\_LENGTH field shall be 8 bits in length. The minimum value of the MSG\_LENGTH field shall be 5.<sup>21</sup> Base stations may send Forward Traffic Channel messages of length up to 255 octets or 2040 bits.

<sup>21</sup>This accommodates the MSG\_LENGTH field, the layer 2 fields present in the Message Body, and the CRC field.

### 7.7.3.2.2 Forward Traffic Channel Message CRC Field

The base station shall set the CRC field of a Forward Traffic Channel message to the CRC computed for the message. The CRC computation shall include the MSG\_LENGTH field and the message body. The CRC field shall be 16 bits in length.

The generator polynomial for the CRC shall be the standard CRC-CCITT polynomial:

$$g(x) = x^{16} + x^{12} + x^5 + 1.$$

The CRC shall be equal to the value computed by the following procedure and the logic shown in Figure 7.7.3.2.2-1:

- All shift register elements shall be initialized to logical one.<sup>22</sup>
- The switches shall be set in the up position.
- The information bit count  $k$  shall be defined as  $8 + \text{message body length in bits}$ .
- The register shall be clocked  $k$  times, with the length and message body fields of the message as the  $k$  input bits.
- The switches shall be set in the down position.
- The register shall be clocked an additional 16 times.
- The 16 additional output bits shall be the CRC field.
- The bits shall be transmitted in the order in which they appear at the output of the CRC encoder.

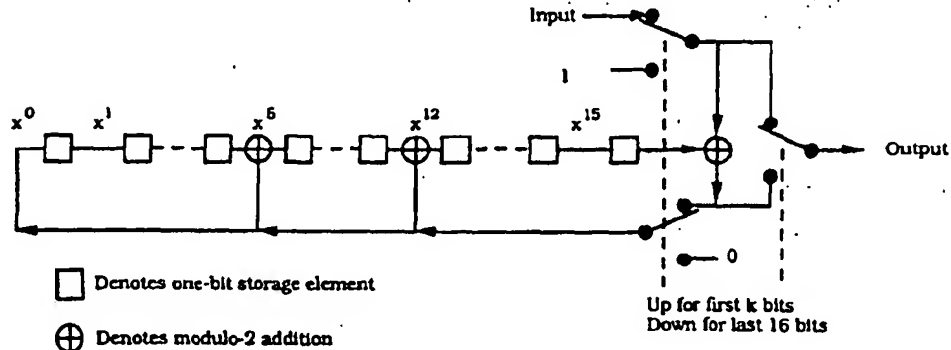


Figure 7.7.3.2.2-1. Forward Traffic Channel Signaling CRC Calculation

<sup>22</sup>Initialization of the register to ones causes the CRC for all-zero data to be non-zero.

### 7.7.3.3 Forward Traffic Channel Message Body Formats

The signaling messages sent over the Forward Traffic Channel are summarized in Table 7.7.3.3-1.

**Table 7.7.3.3-1. Forward Traffic Channel Messages**

Message Name	Message type (binary)
Order Message	00000001
Authentication Challenge Message	00000010
Alert With Information Message	00000011
Data Burst Message	00000100
Handoff Direction Message	00000101
Analog Handoff Direction Message	00000110
In-Traffic System Parameters Message	00000111
Neighbor List Update Message	00001000
Send Burst DTMF Message	00001001
Power Control Parameters Message	00001010
Retrieve Parameters Message	00001011
Set Parameters Message	00001100
SSD Update Message	00001101
Flash With Information Message	00001110
Mobile Station Registered Message	00001111
Reserved	00010000
Extended Handoff Direction Message	00010001

1   7.7.3.3.1 Common Fields

2   7.7.3.3.1.1 Common Acknowledgement Fields

3   All Forward Traffic Channel messages share the same acknowledgement fields:

4       ACK\_SEQ   -   Acknowledgement sequence number.

5                   The base station shall set this field to the value of the  
6                   MSG\_SEQ field from the most recently received Reverse Traffic  
7                   Channel message requiring acknowledgement (see 7.6.4.1.3).

8       MSG\_SEQ   -   Message sequence number.

9                   The base station shall set this field to the message sequence  
10                  number for this message (see 7.6.4.1.3).

11      ACK\_REQ   -   Acknowledgement required indicator.

12                  This field indicates whether this message requires an  
13                  acknowledgement.

14                  To indicate that this message requires acknowledgement, the  
15                  base station shall set this field to '1'. To indicate that this  
16                  message does not require acknowledgement, the base station  
17                  shall set this field to '0'.

18   7.7.3.3.1.2 Common Encryption Field

19   All Forward Traffic Channel messages contain the following field:

20      ENCRYPTION   -   Message encryption indicator.

21                   The base station shall set this field to the current message  
22                   encryption mode, equal to the ENCRYPT\_MODE field of the  
23                   last transmitted *Channel Assignment Message* directed to the  
24                   mobile station, *Extended Handoff Direction Message*, *Handoff*  
25                   *Direction Message*, or *Message Encryption Mode Order*. The  
26                   value of this field and the encryption state of a message shall  
27                   not change if the same message is retransmitted.

### 7.7.3.3.2 Message Body Contents

The following sections specify the contents of the message body for each message that may be sent on the Forward Traffic Channel.

#### 7.7.3.3.2.1 Order Message

When the base station sends an *Order Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000001')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
USE_TIME	1
ACTION_TIME	6
ORDER	6
ADD_RECORD_LEN	3
order-specific fields (if used)	8 × ADD_RECORD_LEN
RESERVED	7

- MSG\_TYPE - Message type.  
The base station shall set this field to '00000001'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 7.7.3.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 7.7.3.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 7.7.3.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 7.7.3.3.1.2.
- USE\_TIME - Use action time indicator.  
This field indicates whether an ACTION\_TIME is specified in this order.

1			If an ACTION_TIME can be specified for this order code, as
2			shown in table 7.7.4-1, the base station may set this field to
3			'1'. Otherwise, the base station shall set this field to '0'.
4	ACTION_TIME	-	Action time.
5			If the USE_TIME field is set to '1', the base station shall set
6			this field to the System Time, in units of 80 ms (modulo 64),
7			at which the order is to take effect. If the USE_TIME field is
8			set to '0' the base station shall set this field to '000000'.
9	ORDER	-	Order code.
10			The base station shall set this field to the ORDER code for this
11			type of <i>Order Message</i> (see 7.7.4).
12	ADD_RECORD_LEN	-	Additional record length.
13			The base station shall set this field to the number of octets in
14			the order-specific fields included in this message.
15	order-specific fields	-	Order-specific fields.
16			The base station shall include order-specific fields as specified
17			in 7.7.4.
18			
19	RESERVED	-	Reserved bits.
20			The base station shall set these bits to '0000000'.

### 7.7.3.3.2.2 Authentication Challenge Message

When the base station sends an *Authentication Challenge Message* on the Forward Traffic Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00000010')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
RANDU	24

RESERVED	7
----------	---

MSG\_TYPE - Message type.

The base station shall set this field to '00000010'.

ACK\_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG\_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTION - Message encryption indicator.

See 7.7.3.3.1.2.

RANDU - Random challenge data.

The base station shall set this field as specified in 6.3.12.1.5.

RESERVED - Reserved bits.

The base station shall set these bits to '0000000'.

1 **7.7.3.3.2.3 Alert With Information Message**

2 When the base station sends an *Alert With Information Message*, it shall use the following  
3 variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000011')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2

Zero or more occurrences of the following record:

RECORD_TYPE	8
RECORD_LEN	8
Type-specific fields	8 × RECORD_LEN

RESERVED	7
----------	---

5

6

MSG\_TYPE - Message type.

7

The base station shall set this field to '00000011'.

8

ACK\_SEQ - Acknowledgement sequence number.

9

See 7.7.3.3.1.1.

10

MSG\_SEQ - Message sequence number.

11

See 7.7.3.3.1.1.

12

ACK\_REQ - Acknowledgement required indicator.

13

See 7.7.3.3.1.1.

14

ENCRYPTION - Message encryption indicator.

15

See 7.7.3.3.1.2.

16

The base station shall include occurrences of the following three-field record as specified in  
17 7.7.5.

18

RECORD\_TYPE - Information record type.

19

The base station shall set this field as specified in 7.7.5.

20

RECORD\_LEN - Information record length.

21

The base station shall set this field to the number of octets in  
22 the type-specific fields included in this record.



- 1        type-specific fields    -    Type-specific fields.
- 2                                    The base station shall include type-specific fields as specified
- 3                                    in 7.7.5.
- 4        RESERVED                -    Reserved bits.
- 5                                    The base station shall set these bits to '0000000'.

#### 7.7.3.3.2.4 Data Burst Message

When the base station sends a *Data Burst Message* on the Forward Traffic Channel, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000100')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
MSG_NUMBER	8
BURST_TYPE	6
NUM_MSGS	8
NUM_FIELDS	8

NUM\_FIELDS occurrences of the following field:

CHARI	8
-------	---

RESERVED	1
----------	---

- MSG\_TYPE - Message type.  
The base station shall set this field to '00000100'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 7.7.3.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 7.7.3.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 7.7.3.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 7.7.3.3.1.2.
- MSG\_NUMBER - Message number.  
The base station shall set this field to the number of this message within the data burst stream.

**BURST\_TYPE** - Data burst type.

The base station shall set the value of this field for the type of this data burst as defined in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*. If the base station sets this field equal to '111111', it shall set the first two CHARi fields of this message equal to the EXTENDED BURST TYPE as described in the definition of CHARi below.

**NUM\_MSGS** - Number of messages in the data burst stream.

The base station shall set this field to the number of messages in this data burst stream.

**NUM\_FIELDS** - Number of characters in this message.

The base station shall set this field to the number of occurrences of the CHARi field included in this message.

**CHARi** - Character.

The base station shall include NUM\_FIELDS occurrences of this field. The base station shall set these fields to the corresponding octet of the data burst stream.

If the BURST TYPE field of this message is equal to '111111', the first two CHARi octets shall represent a single, 16 bit, EXTENDED BURST TYPE field, as shown below. The base station shall set the value of the EXTENDED BURST TYPE according to the type of this data burst as defined in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*.

Field	Length (bits)
EXTENDED_BURST_TYPE (first two CHARi fields)	16
Remaining CHARi fields	8 x (NUM_FIELDS - 2)

**RESERVED** - Reserved bits.

The base station shall set this field to '0'.

### 7.7.3.3.2.5 Handoff Direction Message

When the base station sends a *Handoff Direction Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00000101')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
USE_TIME	1
ACTION_TIME	6
HDM_SEQ	2
SRCH_WIN_A	4
T_ADD	6
T_DROP	6
T_COMP	4
T_TDROP	4
FRAME_OFFSET	4
PRIVATE_LCM	1
RESET_L2	1
ENCRYPT_MODE	2
FREQ_INCL	1
CDMA_FREQ	0 or 11

One or more occurrences of the following record:

PILOT_PN	9
PWR_COMB_IND	1
CODE_CHAN	8

RESERVED	0 - 7 (as needed)
----------	-------------------

MSG\_TYPE - Message type.

The base station shall set this field to '00000101'.

1	ACK_SEQ	- Acknowledgement sequence number.
2		See 7.7.3.3.1.1.
3	MSG_SEQ	- Message sequence number.
4		See 7.7.3.3.1.1.
5	ACK_REQ	- Acknowledgement required indicator.
6		See 7.7.3.3.1.1.
7	ENCRYPTION	- Message encryption indicator.
8		See 7.7.3.3.1.2.
9	USE_TIME	- Use action time indicator.
10		This field indicates whether an ACTION_TIME is specified in
11		this message.
12		If an ACTION_TIME is specified in this message, the base
13		station shall set this field to '1'. Otherwise, the base station
14		shall set this field to '0'.
15	ACTION_TIME	- Action time.
16		If the USE_TIME field is set to '1', the base station shall set
17		this field to the System Time, in units of 80 ms (modulo 64),
18		at which the handoff is to take effect. If the USE_TIME field is
19		set to '0' the base station shall set this field to '000000'.
20	HDM_SEQ	- Handoff Direction Message sequence number.
21		This field is used by the mobile station in the <i>Power</i>
22		<i>Measurement Report Message</i> to identify the order in which
23		the reported pilot strengths are sent.
24		The base station shall set this field to the <i>Handoff Direction</i>
25		<i>Message</i> sequence number, LAST_HDM_SEQ, as specified in
26		7.6.6.2.2.
27	SRCH_WIN_A	- Search window size for the Active Set and Candidate Set.
28		The base station shall set this field to the window size
29		parameter shown in Table 6.6.6.2.1-1 corresponding to the
30		number of PN chips that the mobile station is to search for
31		pilots in the Active Set and Candidate Set.
32	T_ADD	- Pilot detection threshold.
33		This value is used by the mobile station to trigger the sending
34		of the <i>Pilot Strength Measurement Message</i> initiating the
35		handoff process (see 6.6.6).
36		The base station shall set this field to the pilot detection
37		threshold, expressed as an unsigned binary number equal to
38		$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ .
39	T_DROP	- Pilot drop threshold.
40		This value is used by the mobile station to trigger the sending
41		of the <i>Pilot Strength Measurement Message</i> terminating the
42		handoff process and to move pilots from the Candidate Set to
43		the Neighbor Set (see 6.6.6).

1			The base station shall set this field to the pilot drop threshold,
2			expressed as an unsigned binary number equal to
3			$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ .
4	T_COMP	-	Active Set versus Candidate Set comparison threshold.
5			The mobile station transmits a <i>Pilot Strength Measurement</i>
6			<i>Message</i> when the strength of a pilot in the Candidate Set
7			exceeds that of a pilot in the Active Set by this margin (see
8			6.6.6.2.5.2).
9			The base station shall set this field to the threshold Candidate
10			Set pilot to Active Set pilot ratio, in units of 0.5 dB.
11	T_TDROP	-	Drop timer value.
12			Timer value after which an action is taken by the mobile
13			station for a pilot that is a member of the Active Set or
14			Candidate Set, and whose strength has not become greater
15			than T_DROP. If the pilot is a member of the Active Set, a
16			<i>Pilot Strength Measurement Message</i> is issued. If the pilot is a
17			member of the Candidate Set, it will be moved to the Neighbor
18			Set.
19			The base station shall set this field to the T_TDROP value
20			shown in Table 6.6.6.2.3-1 corresponding to the drop timer
21			value to be used by the mobile station.
22	FRAME_OFFSET	-	Frame offset.
23			The Forward and Reverse Traffic Channel frames are delayed
24			FRAME_OFFSET $\times$ 1.25 ms relative to system timing (see
25			7.1.3.5.1).
26			The base station shall set this field to the Forward and
27			Reverse Traffic Channel frame offset.
28	PRIVATE_LCM	-	Private long code mask indicator.
29			This field is used to change the long code mask after a hard
30			handoff.
31			If the private long code mask is to be used after the handoff,
32			the base station shall set this field to '1'. Otherwise the base
33			station shall set this field to '0'.
34	RESET_L2	-	Reset acknowledgement procedures command.
35			This field is used to reset acknowledgement processing in the
36			mobile station.
37			To direct the mobile station to reset its acknowledgement
38			procedures, the base station shall set this field to '1'.
39			Otherwise, the base station shall set this field to '0'.
40	ENCRYPT_MODE	-	Message encryption mode.
41			The base station shall set this field to the ENCRYPT_MODE
42			value shown in Table 7.7.2.3.2.8-2 corresponding to the
43			encrypting mode that is to be used for messages sent on the
44			Forward and Reverse Traffic Channels, as specified
45			in 6.3.12.2.

- 1           FREQ\_INCL   -   Alternate frequency assignment indicator.  
2                        If the CDMA\_FREQ field is included for this message, the base  
3                        station shall set this field to '1'. Otherwise, the base station  
4                        shall set this field to '0'.  
5           CDMA\_FREQ   -   Frequency assignment for the CDMA Channel.  
6                        If the FREQ\_INCL field is set to '1', the base station shall set  
7                        this field to the CDMA Channel number corresponding to the  
8                        CDMA frequency assignment for the CDMA Channel as  
9                        specified in 7.1.1.1. Otherwise, the base station shall omit  
10                       this field.  
11   The base station shall include one occurrence of the following three-field record for each  
12   member of the mobile station's new Active Set.  
13           PILOT\_PN    -   Pilot PN sequence offset index.  
14                        The base station shall set this field to the pilot PN sequence  
15                        offset for this pilot in units of 64 PN chips.  
16           PWR\_COMB\_IND   -   Power control symbol combining indicator.  
17                        If the Forward Traffic Channel associated with this pilot will  
18                        carry the same closed-loop power control subchannel bits as  
19                        that of the previous pilot in this message, the base station  
20                        shall set this field to '1'. Otherwise, the base station shall set  
21                        this field to '0'. For the first occurrence of this record in the  
22                        message, the base station shall set this field to '0'.  
23           CODE\_CHAN   -   Code channel index.  
24                        The base station shall set this field to the code channel index  
25                        (see 7.1.3.1.8) in the range 1 to 63 inclusive that the mobile  
26                        station is to use on the Forward Traffic Channel associated  
27                        with this pilot.  
28           RESERVED    -   Reserved bits.  
29                        The base station shall add reserved bits as needed in order to  
30                        make the length of the entire message equal to an integer  
31                        number of octets. The base station shall set these bits to '0'.

### 7.7.3.3.2.6 Analog Handoff Direction Message

When the base station sends an *Analog Handoff Direction Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00000110')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
USE_TIME	1
ACTION_TIME	6
SID	15
VMAC	3
ANALOG_CHAN	11
SCC	2
MEM	1
AN_CHAN_TYPE	2
DSCC_MSB	1
RESERVED	5

MSG\_TYPE - Message type.

The base station shall set this field to '00000110'.

ACK\_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG\_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTION - Message encryption indicator.

See 7.7.3.3.1.2.

USE\_TIME - Use action time indicator.

This field indicates whether an ACTION\_TIME is specified in this message.



1			If an ACTION_TIME is specified in this message, the base
2			station shall set this field to '1'. Otherwise, the base station
3			shall set this field to '0'.
4	ACTION_TIME	-	Action time.
5			If the USE_TIME field is set to '1', the base station shall set
6			this field to the System Time, in units of 80 ms (modulo 64),
7			at which the handoff is to take effect. If the USE_TIME field is
8			set to '0' the base station shall set this field to '000000'.
9	SID	-	System identification of the analog system.
10			The base station shall set this field to the system identification
11			number for the analog cellular system (see 2.3.8).
12	VMAC	-	Voice mobile station attenuation code.
13			This field indicates the mobile station's power level associated
14			with the designated voice channel.
15			The base station shall set this field to the MAC value shown in Table
16			2.1.2.2-1 corresponding to the nominal power for this mobile
17			station.
18	ANALOG_CHAN	-	Analog voice channel number.
19			The base station shall set this field to the channel number of
20			the analog voice channel, as specified in Table 2.1.1.1-1.
21	SCC	-	SAT color code.
22			This indicates the supervisory audio tone associated with the
23			designated analog voice channel.
24			The base station shall set this field to the SAT value shown in
25			Table 3.7.1.1-2 (see 2.4.1).
26			If the assignment is to a narrow analog channel, the base station
27			shall set this field to the two least significant bits of the DSCC.
28	MEM	-	Message encryption mode indicator.
29			To enable analog control message encryption on the assigned
30			forward and reverse analog voice channels, the base station
31			shall set this bit to '1'. To disable analog control message
32			encryption, the base station shall set this bit to '0'.
33	AN_CHAN_TYPE	-	Analog voice channel type.
34			The base station shall set this field to the analog channel type
35			as specified in Table 7.7.3.3.2.6-1. If the mobile station does
36			not have narrow analog capability the bits shall be set to '00'.
37	DSCC_MSB	-	Digital supervisory audio tone color code most significant bit.
38			The base station shall set this field to '0' when directing
39			handoff to a wide analog channel. The base station shall set
40			this field to the most significant bit of the DSCC when
41			directing handoff to a narrow analog channel.
42	RESERVED	-	Reserved bits.
43			The base station shall set this field to '00000'.

Table 7.7.3.3.2.6-1. Analog Channel Type

Description	Analog Ch	AN_CHAN_TYPE
Wide channel on ANALOG_CHAN	N	00
Narrow channel 10 kHz below ANALOG_CHAN	N <sub>L</sub>	01
Narrow channel 10 kHz above ANALOG_CHAN	N <sub>U</sub>	10
Narrow channel centered on ANALOG_CHAN	N <sub>M</sub>	11

#### 7.7.3.3.2.7 In-Traffic System Parameters Message

When the base station sends an *In-Traffic System Parameters Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00000111')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
SID	15
NID	16
SRCH_WIN_A	4
SRCH_WIN_N	4
SRCH_WIN_R	4
T_ADD	6
T_DROP	6
T_COMP	4
T_TDROP	4
NGHBR_MAX_AGE	4
RESERVED	4

MSG\_TYPE - Message type.

The base station shall set this field to '00000111'.

ACK\_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG\_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTION - Message encryption indicator.

See 7.7.3.3.1.2.

1	SID	-	System identification.
2			The base station shall set this field to the system identification
3			number for this cellular system (see 6.6.5.2).
4	NID	-	Network identification.
5			This field serves as a sub-identifier of a system as defined by
6			the owner of the SID.
7			The base station shall set this field to the network
8			identification number for this network (see 6.6.5.2).
9	SRCH_WIN_A	-	Search window size for the Active Set and Candidate Set.
10			The base station shall set this field to the window size
11			parameter shown in Table 6.6.6.2.1-1 corresponding to the
12			number of PN chips that the mobile station is to search for
13			pilots in the Active Set and Candidate Set.
14	SRCH_WIN_N	-	Search window size for the Neighbor Set.
15			The base station shall set this field to the window size
16			parameter shown in Table 6.6.6.2.1-1 corresponding to the
17			number of PN chips that the mobile station is to search for
18			pilots in the Neighbor Set.
19	SRCH_WIN_R	-	Search window size for the Remaining Set.
20			The base station shall set this field to the window size
21			parameter shown in Table 6.6.6.2.1-1 corresponding to the
22			number of PN chips that the mobile station is to search for
23			pilots in the Remaining Set.
24	T_ADD	-	Pilot detection threshold.
25			This value is used by the mobile station to trigger the sending
26			of the <i>Pilot Strength Measurement Message</i> initiating the
27			handoff process (see 6.6.6).
28			The base station shall set this field to the pilot detection
29			threshold, expressed as an unsigned binary number equal to
30			$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ .
31	T_DROP	-	Pilot drop threshold.
32			This value is used by the mobile station to trigger the sending
33			of the <i>Pilot Strength Measurement Message</i> terminating the
34			handoff process and to move pilots from the Candidate Set to
35			the Neighbor Set (see 6.6.6).
36			The base station shall set this field to the pilot drop threshold,
37			expressed as an unsigned binary number equal to
38			$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ .

1	T_COMP	-	Active Set versus Candidate Set comparison threshold.
2			The mobile station transmits a <i>Pilot Strength Measurement</i>
3			<i>Message</i> when the strength of a pilot in the Candidate Set
4			exceeds that of a pilot in the Active Set by this margin (see
5			6.6.6.2.5.2).
6			The base station shall set this field to the threshold Candidate
7			Set pilot to Active Set pilot ratio, in units of 0.5 dB.
8	T_TDROP	-	Drop timer value.
9			Timer value after which an action is taken by the mobile
10			station for a pilot that is a member of the Active Set or
11			Candidate Set, and whose strength has not become greater
12			than T_DROP. If the pilot is a member of the Active Set, a
13			<i>Pilot Strength Measurement Message</i> is issued. If the pilot is a
14			member of the Candidate Set, it will be moved to the Neighbor
15			Set.
16			The base station shall set this field to the T_TDROP value
17			shown in Table 6.6.6.2.3-1 corresponding to the drop timer
18			value to be used by the mobile station.
19	NGHBR_MAX_AGE	-	Maximum age for retention of Neighbor Set members.
20			The mobile station drops neighbor set members whose AGE
21			count exceeds this field.
22			The base station shall set this field to the Neighbor Set
23			maximum age retention value (see 6.6.6.2.6.3).
24	RESERVED	-	Reserved bits.
25			The base station shall set this field to '0000'.

1 7.7.3.3.2.8 Neighbor List Update Message

2 When the base station sends a *Neighbor List Update Message*, it shall use the following  
3 variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001000')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
PILOT_INC	4

One or more occurrences of the following field:

NGHBR_PN	9
----------	---

RESERVED	0 - 7 (as needed)
----------	-------------------

5  
6 MSG\_TYPE - Message type.

7 The base station shall set this field to '00001000'.

8 ACK\_SEQ - Acknowledgement sequence number.

9 See 7.7.3.3.1.1.

10 MSG\_SEQ - Message sequence number.

11 See 7.7.3.3.1.1.

12 ACK\_REQ - Acknowledgement required indicator.

13 See 7.7.3.3.1.1.

14 ENCRYPTION - Message encryption indicator.

15 See 7.7.3.3.1.2.

16 PILOT\_INC - Pilot PN sequence offset index increment.

17 The mobile station searches for Remaining Set pilots at pilot  
18 PN sequence offset index values that are multiples of this  
19 value.

20 The base station shall set this field to the pilot PN sequence  
21 increment, in units of 64 PN chips, that the mobile station is  
22 to use for searching the Remaining Set. The base station  
23 should set this field to the largest increment such that the  
24 pilot PN sequence offsets of all its neighbor base stations are  
25 integer multiples of that increment.

- 1           NGHBR\_PN   -   Neighbor pilot PN sequence offset index.  
2                           The base station shall include one occurrence of this field for  
3                           each pilot in its neighbor list. The base station shall set this  
4                           field to the pilot's PN sequence offset, in units of 64 PN chips.  
5           RESERVED   -   Reserved bits.  
6                           The base station shall add reserved bits as needed in order to  
7                           make the length of the entire message equal to an integer  
8                           number of octets. The base station shall set these bits to '0'.

1 7.7.3.3.2.9 Send Burst DTMF Message

2 When the base station sends a *Send Burst DTMF Message*, it shall use the following  
3 variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001001')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
NUM_DIGITS	8
DTMF_ON_LENGTH	3
DTMF_OFF_LENGTH	3

NUM\_DIGITS occurrences of the following field:

DIGIT	4
-------	---

RESERVED	0 - 7 (as needed)
----------	-------------------

- 5
- 6 MSG\_TYPE - Message type.
- 7 The base station shall set this field to '00001001'.
- 8 ACK\_SEQ - Acknowledgement sequence number.
- 9 See 7.7.3.3.1.1.
- 10 MSG\_SEQ - Message sequence number.
- 11 See 7.7.3.3.1.1.
- 12 ACK\_REQ - Acknowledgement required indicator.
- 13 See 7.7.3.3.1.1.
- 14 ENCRYPTION - Message encryption indicator
- 15 See 7.7.3.3.1.2.
- 16 NUM\_DIGITS - Number of DTMF digits.
- 17 The base station shall set this field to the number of DTMF
- 18 digits included in this message.
- 19 DTMF\_ON\_LENGTH - DTMF pulse width code.
- 20 The base station shall set this field to the DTMF\_ON\_LENGTH
- 21 value shown in Table 6.7.2.3.2.7-1 corresponding to the
- 22 requested pulse width of the DTMF pulse to be generated by
- 23 the mobile station.



1	DTMF_OFF_LENGTH	-	DTMF interdigit interval code.
2			The base station shall set this field to the
3			DTMF_OFF_LENGTH value shown in Table 6.7.2.3.2.7-2
4			corresponding to the requested minimum interdigit interval
5			between DTMF pulses to be generated by the mobile station.
6	DIGIT	-	DTMF digit.
7			The base station shall include one occurrence of this field for
8			each DTMF digit to be generated by the mobile station. The
9			base station shall set each occurrence of this field to the code
10			value shown in Table 6.7.1.3.2.4-4 corresponding to the
11			dialed digit.
12	RESERVED	-	Reserved bits.
13			The base station shall add reserved bits as needed in order to
14			make the length of the entire message equal to an integer
15			number of octets. The base station shall set these bits to '0'.

### 7.7.3.3.2.10 Power Control Parameters Message

When the base station sends a *Power Control Parameters Message*, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00001010')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
PWR_REP_THRESH	5
PWR_REP_FRAMES	4
PWR_THRESH_ENABLE	1
PWR_PERIOD_ENABLE	1
PWR_REP_DELAY	5
RESERVED	7

MSG\_TYPE - Message type.

The base station shall set this field to '00001010'.

ACK\_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG\_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTION - Message encryption indicator.

See 7.7.3.3.1.2.

PWR\_REP\_THRESH - Power control reporting threshold.

The base station shall set this field to the number of bad frames (see 6.2.2.2) to be received in a measurement period before the mobile station is to generate a *Power Measurement Report Message* (see 6.6.4.1.1). If the base station sets PWR\_THRESH\_ENABLE to '1', it shall not set this field to '00000'.

1	PWR_REP_FRAMES	-	Power control reporting frame count.
2			The base station shall set this field to the value such that the
3			number given by
4			$\lfloor 2(PWR\_REP\_FRAMES/2) \times 5 \rfloor$ frames
5			is the number of frames over which the mobile station is to
6			count frame errors.
7	PWR_THRESH-	-	Threshold report mode indicator.
8	_ENABLE		If the mobile station is to generate threshold <i>Power</i>
9			<i>Measurement Report Messages</i> , the base station shall set this
10			field to '1'. If the mobile station is not to generate threshold
11			<i>Power Measurement Report Messages</i> , the base station shall
12			set this field to '0'.
13	PWR_PERIOD-	-	Periodic report mode indicator.
14	_ENABLE		If the mobile station is to generate periodic <i>Power</i>
15			<i>Measurement Report Messages</i> , the base station shall set this
16			field to '1'. If the mobile station is not to generate periodic
17			<i>Power Measurement Report Messages</i> , the base station shall
18			set this field to '0'.
19	PWR_REP_DELAY	-	Power report delay.
20			The period that the mobile station waits following a <i>Power</i>
21			<i>Measurement Report Message</i> before restarting frame counting
22			for power control purposes.
23			The base station shall set this field to the power report delay
24			value, in units of 4 frames (see 6.6.4.1.1).
25	RESERVED	-	Reserved bits.
26			The base station shall set this field to '0000000'.
27			

### 7.7.3.3.2.11 Retrieve Parameters Message

When the base station sends a *Retrieve Parameters Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001011')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2

One or more occurrences of the following field:

PARAMETER_ID	16
--------------	----

RESERVED	7
----------	---

- MSG\_TYPE - Message type.  
The base station shall set this field to '00001011'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 7.7.3.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 7.7.3.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 7.7.3.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 7.7.3.3.1.2.
- PARAMETER\_ID - Parameter identification.  
The base station can request the mobile station to report any parameter specified in Table E-1.  
The base station shall include one occurrence of this field for each parameter requested. The base station shall set this field to the parameter identification number specified in Table E-1 corresponding to the parameter requested.
- RESERVED - Reserved bits.  
The base station shall set this field to '0000000'.

### 7.7.3.3.2.12 Set Parameters Message

When the base station sends a *Set Parameters Message*, it shall use the following variable-length message format:

Field	Length (bits)
MSG_TYPE ('00001100')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2

One or more occurrences of the following record:

PARAMETER_ID	16
PARAMETER_LEN	10
PARAMETER	PARAMETER_LEN + 1

RESERVED	0 - 7 (as needed)
----------	-------------------

- MSG\_TYPE - Message type.  
The base station shall set this field to '00001100'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 7.7.3.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 7.7.3.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 7.7.3.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 7.7.3.3.1.2.

The base station shall include one occurrence of the following three-field record for each parameter to be set.

- PARAMETER\_ID - Parameter identification.  
The base station shall set this field to the identification shown in Table E-1 corresponding to the settable parameter to be set.

- 1     **PARAMETER\_LEN**   -   Parameter length.  
2                                 The base station shall set this field to the length shown in  
3                                 Table E-1 corresponding to the parameter to be set.
- 4             **PARAMETER**   -   Parameter value.  
5                                 The base station shall set this field to the value of the  
6                                 parameter specified by the **PARAMETER\_ID** field.
- 7             **RESERVED**   -   Reserved bits.  
8                                 The base station shall add reserved bits as needed in order to  
9                                 make the length of the entire message equal to an integer  
10                                number of octets. The base station shall set these bits to '0'.

#### 7.7.3.3.2.13 SSD Update Message

When the base station sends an *SSD Update Message* on the Forward Traffic Channel, it shall use the following fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00001101')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
RANDSSD	56
RESERVED	7

- MSG\_TYPE - Message type. The base station shall set this field to '00001101'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 7.7.3.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 7.7.3.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 7.7.3.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 7.7.3.3.1.2.
- RANDSSD - Random data.  
The base station shall set this field as specified in 6.3.12.1.9.
- RESERVED - Reserved bits.  
The base station shall set this field to '0000000'.

1 7.7.3.3.2.14 Flash With Information Message

2 When the base station sends a *Flash With Information Message*, it shall use the following  
3 variable-length message format:

Field	Length (bits)
MSG_TYPE {00001110}	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2

One or more occurrences of the following record:

RECORD_TYPE	8
RECORD_LEN	8
Type-specific fields	8 × RECORD_LEN

RESERVED	7
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MSG\_TYPE - Message type.

The base station shall set this field to '00001110'.

ACK\_SEQ - Acknowledgement sequence number.

See 7.7.3.3.1.1.

MSG\_SEQ - Message sequence number.

See 7.7.3.3.1.1.

ACK\_REQ - Acknowledgement required indicator.

See 7.7.3.3.1.1.

ENCRYPTION - Message encryption indicator.

See 7.7.3.3.1.2.

The base station shall include occurrences of the following three-field record as specified in 7.7.5.

RECORD\_TYPE - Information record type.

The base station shall set this field as specified in 7.7.5.

RECORD\_LEN - Information record length.

The base station shall set this field to the number of octets in the type-specific fields included in this record.



- 1      type-specific fields   -   Type-specific fields.  
2                                      The base station shall include type-specific fields as specified  
3                                      in 7.7.5.  
4  
5              RESERVED   -   Reserved bits.  
6                                      The base station shall set this field to '0000000'.

1 7.7.3.3.2.15 Mobile Station Registered Message

- 2 When the base station sends a *Mobile Station Registered Message*, it shall use the following  
 3 fixed-length message format:

Field	Length (bits)
MSG_TYPE ('00001111')	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
SID	15
NID	16
REG_ZONE	12
TOTAL_ZONES	3
ZONE_TIMER	3
MULT_SIDS	1
MULT_NIDS	1
BASE_LAT	22
BASE_LONG	23
REG_DIST	11
RESERVED	4

- 4
- 5 MSG\_TYPE - Message type.  
 6 The base station shall set this field to '00001111'.
- 7 ACK\_SEQ - Acknowledgement sequence number.  
 8 See 7.7.3.3.1.1.
- 9 MSG\_SEQ - Message sequence number.  
 10 See 7.7.3.3.1.1.
- 11 ACK\_REQ - Acknowledgement required indicator.  
 12 See 7.7.3.3.1.1.
- 13 ENCRYPTION - Message encryption indicator.  
 14 See 7.7.3.3.1.2.
- 15 SID - System identification.  
 16 The base station shall set this field to the system identification  
 17 number for this cellular system.

1	NID	-	Network identification.
2			This field serves as a sub-identifier of a system as defined by
3			the owner of the SID.
4			The base station shall set this field to the network
5			identification number for this network. The NID value of
6			65,535 is reserved.
7	REG_ZONE	-	Registration zone.
8			The base station shall set this field to its registration zone
9			number (see 6.6.5.1.5).
10	TOTAL_ZONES	-	Number of registration zones to be retained.
11			The base station shall set this field to the number of
12			registration zones the mobile station is to retain for purposes
13			of zone-based registration (see 6.6.5.1.5).
14			If zone-based registration is to be disabled, the base station
15			shall set this field to '000'.
16	ZONE_TIMER	-	Zone timer length.
17			The base station shall set this field to the ZONE_TIMER value
18			shown in Table 7.7.2.3.2.1-1 corresponding to the length of
19			the zone registration timer to be used by mobile stations.
20	MULT_SIDS	-	Multiple SID storage indicator.
21			If mobile stations may store entries of SID_NID_LIST
22			containing different SIDs, the base station shall set this field
23			to '1'; otherwise the base station shall set this field to '0'.
24	MULT_NIDS	-	Multiple NID storage indicator.
25			If mobile stations may store multiple entries of SID_NID_LIST
26			having the same SID (with different NIDs), the base station
27			shall set this field to '1'; otherwise the base station shall set
28			this field to '0'.
29	BASE_LAT	-	Base station latitude.
30			The base station shall set this field to its latitude in units of
31			0.25 second, expressed as a two's complement signed number
32			with positive numbers signifying North latitudes. The base
33			station shall set this field to a value in the range -1296000 to
34			1296000 inclusive (corresponding to a range of -90° to +90°).
35	BASE_LONG	-	Base station longitude.
36			The base station shall set this field to its longitude in units of
37			0.25 second, expressed as a two's complement signed number
38			with positive numbers signifying East longitude. The base
39			station shall set this field to a value in the range -2592000 to
40			2592000 inclusive (corresponding to a range of -180° to
41			+180°).

- 1           REG\_DIST   -   Registration distance.
- 2                        If mobile stations are to perform distance-based registration,
- 3                        the base station shall set this field to the non-zero "distance"
- 4                        beyond which the mobile station is to re-register (see
- 5                        6.6.5.1.4). If mobile stations are not to perform distance-
- 6                        based registration, the base station shall set this field to 0.
- 7           RESERVED   -   Reserved bits.
- 8                        The base station shall set this field to '0000'.

1 7.7.3.3.2.16 Reserved

1 7.7.3.3.2.17 Extended Handoff Direction Message

2 When the base station sends an *Extended Handoff Direction Message*, it shall use the  
 3 following variable-length message format:

Field	Length (bits)
MSG_TYPE (00010001)	8
ACK_SEQ	3
MSG_SEQ	3
ACK_REQ	1
ENCRYPTION	2
USE_TIME	1
ACTION_TIME	6
HDM_SEQ	2
SEARCH_INCLUDED	1
SRCH_WIN_A	0 or 4
T_ADD	0 or 6
T_DROP	0 or 6
T_COMP	0 or 4
T_TDROP	0 or 4
HARD_INCLUDED	1
FRAME_OFFSET	0 or 4
PRIVATE_LCM	0 or 1
RESET_L2	0 or 1
RESET_FPC	0 or 1
RESERVED	0 or 1
ENCRYPT_MODE	0 or 2
RESERVED	0 or 1
NOM_PWR	0 or 4
NUM_PREAMBLE	0 or 3
BAND_CLASS	0 or 5
CDMA_FREQ	0 or 11

(continues on next page)

Field	Length (bits)
ADD_LENGTH	3
Additional fields	8 × ADD_LENGTH

One or more occurrences of the following record:

PILOT_PN	9
PWR_COMB_IND	1
CODE_CHAN	8

RESERVED	0 - 7 (as needed)
----------	-------------------

- MSG\_TYPE - Message type.  
The base station shall set this field to '00010001'.
- ACK\_SEQ - Acknowledgement sequence number.  
See 7.7.3.3.1.1.
- MSG\_SEQ - Message sequence number.  
See 7.7.3.3.1.1.
- ACK\_REQ - Acknowledgement required indicator.  
See 7.7.3.3.1.1.
- ENCRYPTION - Message encryption indicator.  
See 7.7.3.3.1.2.
- USE\_TIME - Use action time indicator.  
This field indicates whether an ACTION\_TIME is specified in this message.  
If an ACTION\_TIME is specified in this message, the base station shall set this field to '1'. Otherwise, the base station shall set this field to '0'.
- ACTION\_TIME - Action time.  
If the USE\_TIME field is set to '1', the base station shall set this field to the System Time, in units of 80 ms (modulo 64), at which the handoff is to take effect. If the USE\_TIME field is set to '0' the base station shall set this field to '000000'.
- HDM\_SEQ - *Extended Handoff Direction Message* sequence number.  
This field is used by the mobile station in the *Power Measurement Report Message* to identify the order in which the reported pilot strengths are sent.

1			The base station shall set this field to the <i>Extended Handoff</i>
2			<i>Direction Message</i> sequence number, LAST_HDM_SEQ, as
3			specified in 7.6.6.2.2.
4	SEARCH_INCLUDED	-	Pilot search parameters included.
5			If the mobile station is to change its pilot search parameters,
6			the base station shall set this field to '1'. Otherwise, the base
7			station shall set this field to '0'.
8	SRCH_WIN_A	-	Search window size for the Active Set and Candidate Set.
9			If SEARCH_INCLUDED is set to '1', the base station shall
10			include the field SRCH_WIN_A and set this field to the window
11			size parameter shown in Table 6.6.6.2.1-1 corresponding to
12			the number of PN chips that the mobile station is to search for
13			pilots in the Active Set and Candidate Set. Otherwise, the
14			base station shall omit this field.
15	T_ADD	-	Pilot detection threshold.
16			This value is used by the mobile station to trigger the sending
17			of the <i>Pilot Strength Measurement Message</i> initiating the
18			handoff process (see 6.6.6).
19			If SEARCH_INCLUDED is set to '1', the base station shall
20			include the field T_ADD and set this field to the pilot detection
21			threshold, expressed as an unsigned binary number equal to
22			$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ . Otherwise, the base station shall
23			omit this field.
24	T_DROP	-	Pilot drop threshold.
25			This value is used by the mobile station to trigger the sending
26			of the <i>Pilot Strength Measurement Message</i> terminating the
27			handoff process and to move pilots from the Candidate Set to
28			the Neighbor Set (see 6.6.6).
29			If SEARCH_INCLUDED is set to '1', the base station shall
30			include the field T_DROP and set this field to the pilot drop
31			threshold, expressed as an unsigned binary number equal to
32			$\lfloor -2 \times 10 \times \log_{10} E_c/I_0 \rfloor$ . Otherwise, the base station shall
33			omit this field.
34	T_COMP	-	Active Set versus Candidate Set comparison threshold.
35			The mobile station transmits a <i>Pilot Strength Measurement</i>
36			<i>Message</i> when the strength of a pilot in the Candidate Set
37			exceeds that of a pilot in the Active Set by this margin (see
38			6.6.6.2.5.2).
39			If SEARCH_INCLUDED is set to '1', the base station shall
40			include the field T_COMP and set this field to the threshold
41			Candidate Set pilot to Active Set pilot ratio, in units of 0.5 dB.
42			Otherwise, the base station shall omit this field.



1	<b>T_DROP</b>	- Drop timer value.
2		Timer value after which an action is taken by the mobile
3		station for a pilot that is a member of the Active Set or
4		Candidate Set, and whose strength has not become greater
5		than T_DROP. If the pilot is a member of the Active Set, a
6		<i>Pilot Strength Measurement Message</i> is issued. If the pilot is a
7		member of the Candidate Set, it will be moved to the Neighbor
8		Set.
9		If SEARCH_INCLUDED is set to '1', the base station shall
10		include the field T_DROP and set this field to the T_DROP
11		value shown in Table 6.6.6.2.3-1 corresponding to the drop
12		timer value to be used by the mobile station. Otherwise, the
13		base station shall omit this field.
14	<b>HARD_INCLUDED</b>	- Hard handoff parameters included.
15		If the mobile station is to change FRAME_OFFSET,
16		PRIVATE_LCM, ENCRYPT_MODE, NOM_PWR, BAND_CLASS,
17		or CDMA_FREQ, the base station shall set this field to '1'.
18		Otherwise, the base station shall set this field to '0'.
19	<b>FRAME_OFFSET</b>	- Frame offset.
20		The Forward and Reverse Traffic Channel frames are delayed
21		FRAME_OFFSET × 1.25 ms relative to system timing (see
22		7.1.3.5.1).
23		If HARD_INCLUDED is set to '1', the base station shall include
24		the field FRAME_OFFSET and set it to the Forward and
25		Reverse Traffic Channel frame offset. Otherwise, the base
26		station shall omit this field.
27	<b>PRIVATE_LCM</b>	- Private long code mask indicator.
28		This field is used to change the long code mask after a hard
29		handoff.
30		If HARD_INCLUDED is set to '1', the base station shall include
31		the field PRIVATE_LCM and set it as described below.
32		Otherwise, the base station shall omit this field.
33		If the private long code mask is to be used after the handoff,
34		the base station shall set this field to '1'. Otherwise, the base
35		station shall set this field to '0'.
36	<b>RESET_L2</b>	- Reset acknowledgement procedures command.
37		This field is used to reset acknowledgement processing in the
38		mobile station.
39		If HARD_INCLUDED is set to '1', the base station shall include
40		the field RESET_L2 and set it as described below. Otherwise,
41		the base station shall omit this field.
42		If the field is included and the mobile station is to reset its
43		acknowledgement procedures, the base station shall set this
44		field to '1'. Otherwise, the base station shall set this field to
45		'0'.

1	RESET_FPC	-	Reset Forward Traffic Channel power control.
2			This field is used to reset the Forward Traffic Channel power control counters.
3			
4			If HARD_INCLUDED is set to '1', the base station shall include the field RESET_FPC and set it as described below.
5			Otherwise, the base station shall omit this field.
6			
7			The base station shall set this field to '0' if the Forward Traffic Channel power control counters are to be maintained after completion of the handoff. If the counters are to be initialized as specified in 6.6.4.1.1.1, then the base station shall set this field to '1'.
8			
9			
10			
11			
12	RESERVED	-	Reserved bit.
13			If HARD_INCLUDED is set to '1', the base station shall include the field RESERVED and set it to '0'. Otherwise, the base station shall omit this field.
14			
15			
16	ENCRYPT_MODE	-	Message encryption mode.
17			If HARD_INCLUDED is set to '1', the base station shall include the field ENCRYPT_MODE and set it to the ENCRYPT_MODE value shown in Table 7.7.2.3.2.8-2 corresponding to the encrypting mode that is to be used for messages sent on the Forward and Reverse Traffic Channels, as specified in 6.3.12.2. Otherwise, the base station shall omit this field.
18			
19			
20			
21			
22			
23	RESERVED	-	Reserved bit.
24			If HARD_INCLUDED is set to '1', the base station shall include the field RESERVED and set it to '0'. Otherwise, the base station shall omit this field.
25			
26			
27	NOM_PWR	-	Nominal transmit power offset.
28			If HARD_INCLUDED is set to '1', the base station shall include the field NOM_PWR and set it to the correction factor to be used by the mobile station in the open loop power estimate, expressed as a two's complement value in units of 1 dB (see 6.1.2.3.1). Otherwise, the base station shall omit this field.
29			
30			
31			
32			
33			
34	NUM_PREAMBLE	-	Number of Traffic Channel preamble frames.
35			If HARD_INCLUDED is set to '1', the base station shall include the field NUM_PREAMBLE and set it to the number of Traffic Channel preamble frames that the mobile station is to send when performing a handoff. Otherwise, the base station shall omit this field.
36			
37			
38			
39			
40	BAND_CLASS	-	Band class.
41			If HARD_INCLUDED is set to '1', the base station shall include the field BAND_CLASS and set it to the CDMA band class corresponding to the CDMA frequency assignment for the CDMA Channel as specified in TSB58. Otherwise, the base station shall omit this field.
42			
43			
44			
45			

1	CDMA_FREQ	-	Frequency assignment.
2			If HARD_INCLUDED is set to '1', the base station shall include
3			the field CDMA_FREQ and set it to the CDMA Channel
4			number, in the specified CDMA band class, corresponding to
5			the CDMA frequency assignment for the CDMA Channel as
6			specified in 7.1.1.1. Otherwise, the base station shall omit
7			this field.
8	ADD_LENGTH	-	Number of octets in the additional fields.
9			The base station shall set this field to '000'.
10	Additional fields	-	There are no additional fields defined by this revision.
11			
12	The base station shall include one occurrence of the following three-field record for each		
13	member of the mobile station's new Active Set.		
14	PILOT_PN	-	Pilot PN sequence offset index.
15			The base station shall set this field to the pilot PN sequence
16			offset for this pilot in units of 64 PN chips.
17	PWR_COMB_IND	-	Power control symbol combining indicator.
18			If the Forward Traffic Channel associated with this pilot will
19			carry the same closed-loop power control subchannel bits as
20			that of the previous pilot in this message, the base station
21			shall set this field to '1'. Otherwise, the base station shall set
22			this field to '0'. For the first occurrence of this record in the
23			message, the base station shall set this field to '0'.
24	CODE_CHAN	-	Code channel index.
25			The base station shall set this field to the code channel index
26			(see 7.1.3.1.8) in the range 1 to 63 inclusive that the mobile
27			station is to use on the Forward Traffic Channel associated
28			with this pilot.
29			
30	RESERVED	-	Reserved bits.
31			The base station shall add reserved bits as needed in order to
32			make the length of the entire message equal to an integer
33			number of octets. The base station shall set these bits to '0'.

#### 7.7.4 Orders

*Order Messages* are sent by the base station on the Paging Channel and on the Forward Traffic Channel. The general format used on the Paging Channel is defined in 7.7.2.3.2.7, and the general format used on the Forward Traffic Channel is defined in 7.7.3.3.2.1. There are many specific types of *Order Messages*, as shown in Table 7.7.4-1.

The base station may send on the Paging Channel any type of order shown in Table 7.7.4-1 with a 'Y' in the first column, but shall not send on the Paging Channel any type of order with an 'N' in the first column. The base station may send on the Forward Traffic Channel any type of order shown in Table 7.7.4-1 with a 'Y' in the second column, but shall not send on the Forward Traffic Channel any type of order with an 'N' in the second column.

An order consists of a 6-bit order code and zero or more order-specific fields. The base station shall set the ORDER field in the *Order Message* to the order code shown in Table 7.7.4-1 corresponding to the type of order being sent.

If the order qualification code in the fourth column of Table 7.7.4-1 is '00000000' and there are no other additional fields as shown by an 'N' in the sixth column, the base station shall include no order qualification code or other order-specific fields in the *Order Message*. The order qualification code of such a message is implicitly '00000000'.

If the order qualification code is not '00000000' and there are no other additional fields as shown in Table 7.7.4-1 by an 'N' in the sixth column, the base station shall include the order qualification code as the only order specific field in the *Order Message*.

If there are other additional fields as shown in Table 7.7.4-1 by a 'Y' in the sixth column, the base station shall include order-specific fields as specified in the corresponding subsection of this section.

Table 7.7.4-1. Order and Order Qualification Codes Used on the Paging Channel and the Forward Traffic Channel (Part 1 of 3)

Paging Channel Order	Forward Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDQ (binary)	ACTION TIME can be specified	Additional Fields other than ORDQ	Name/Function
Y	N	000001	00000000	N	N	Abbreviated Alert Order
Y	Y	000010	00000000	N	Y	Base Station Challenge Confirmation Order (see 7.7.4.1)
N	Y	000011	000000nn	Y	N	Message Encryption Mode Order (where nn is the mode per Table 7.7.2.3.2.8-2)
Y	N	000100	00000000	N	N	Reorder Order
N	Y	000101	0000nnnn	N	N	Parameter Update Order (where 'nnnn' is the Request Number)
Y	Y	000110	00000000	N	N	Audit Order
Y	N	001001	00000000	N	N	Intercept Order
N	Y	001010	00000000	N	N	Maintenance Order
Y	Y	010000	00000000	N	N	Base Station Acknowledgement Order
N	Y	010001	00000000	N	N	Pilot Measurement Request Order
Y	Y	010010	0001nnnn	N	N	Lock Until Power-Cycled Order (where nnnn is the lock reason)
Y	Y	010010	0010nnnn	N	N	Maintenance Required Order (where nnnn is the maintenance reason)
Y	N	010010	11111111	N	N	Unlock Order
N	Y	010011	00000000	Y	Y	Service Option Request Order (see 7.7.4.2)

Table 7.7.4-1. Order and Order Qualification Codes Used on the Paging Channel and the Forward Traffic Channel (Part 2 of 3)

Paging Channel Order	Forward Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDQ (binary)	ACTION TIME can be specified	Additional Fields other than ORDQ	Name/Function
N	Y	010100	00000000	Y	Y	Service Option Response Order (see 7.7.4.3)
Y	Y	010101	00000000	N	N	Release Order (no reason given)
Y	Y	010101	00000010	N	N	Release Order (indicates that requested service option is rejected)
N	Y	010111	00000000	Y	N	Long Code Transition Request Order (request public)
N	Y	010111	00000001	Y	N	Long Code Transition Request Order (request private)
N	Y	011001	0000nnnn	N	N	Continuous DTMF Tone Order (where the tone is designated by 'nnnn' as defined in Table 6.7.1.3.2.4-4)
N	Y	011001	11111111	N	N	Continuous DTMF Tone Order (Stop continuous DTMF tone)
N	Y	011010	nnnnnnnn	N	Y	Status Request Order (see 7.7.4.4)
Y	N	011011	00000000	N	N	Registration Accepted Order
Y	N	011011	00000001	N	N	Registration Request Order

1 **Table 7.7.4-1. Order and Order Qualification Codes Used on the Paging Channel and**  
 2 **the Forward Traffic Channel (Part 3 of 3)**

Paging Channel Order	Forward Traffic Channel Order	Order Code, ORDER (binary)	Order Qualification Code, ORDg (binary)	ACTION TIME can be specified	Additional Fields other than ORDg	Name/Function
Y	N	011011	00000010	N	N	Registration Rejected Order
N	Y	011101	nnnnnnnn	Y	N	Service Option Control Order (the specific control is designated by 'nnnnnnnn' as determined by each service option)
Y	Y	011110	nnnnnnnn	N	N	Local Control Order (the specific order is designated by 'nnnnnnnn' as determined by each system)
All other codes are reserved.						

## 7.7.4.1 Base Station Challenge Confirmation Order

The *Base Station Challenge Confirmation Order* can be sent on either the Paging Channel or on the Forward Traffic Channel. The base station shall use the following fixed-length format for the order-specific fields:

Order Specific Field	Length (bits)
ORDQ	8
AUTHBS	18
RESERVED	6

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

AUTHBS - Challenge response.

The base station shall set this field as specified in 6.3.12.1.9.

RESERVED - Reserved bits.

The base station shall set this field to '000000'.



## 7.7.4.2 Service Option Request Order

The *Service Option Request Order* can be sent only on the Forward Traffic Channel. The base station shall use the following fixed-length format for the order-specific fields:

Order Specific Field	Length (bits)
ORDQ	8
SERVICE_OPTION	16

ORDQ - Order qualification code.

The base station shall set this field to '00000000'.

SERVICE\_OPTION - Service option.

The base station shall set this field to the service option code shown in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*, corresponding to the requested or alternative service option.

## 1 7.7.4.3 Service Option Response Order

2 The *Service Option Response Order* can be sent only on the Forward Traffic Channel. The  
3 base station shall use the following fixed-length format for the order-specific fields:

Order Specific Field	Length (bits)
ORDQ	8
SERVICE_OPTION	16

5

6

ORDQ - Order qualification code.

7

The base station shall set this field to '00000000'.

8

SERVICE\_OPTION - Service option.

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The base station shall set this field to the service option code shown in TSB58, *Administration of Parameter Value Assignments for TIA/EIA Wideband Spread Spectrum Standards*, corresponding to the accepted service option, or to '0000000000000000' to reject the last service option requested by the mobile station.

#### 7.7.4.4 Status Request Order

The *Status Request Order* can be sent only on the Forward Traffic Channel. The **ORDQ** field of the *Status Request Order* specifies the information record to be returned by the mobile station in the *Status Message*. The base station shall use the following variable-length format for the order-specific fields:

Order Specific Field	Length (bits)
ORDQ	8

**ORDQ**

Order qualification code.

The base station shall set this field to the order qualification code corresponding to the information record type to be returned by the mobile station in the *Status Message*, as shown in Table 7.7.4.4-1.

**Table 7.7.4.4-1. Status Request ORDQ Values**

Information Record Requested	ORDQ (binary)
Reserved	00000110
Call Mode	00000111
Terminal Information	00001000
Roaming Information	00001001
Security Status	00001010
IMSI	00001100
ESN	00001101
All other ORDQ values are reserved.	

### 7.7.5 Information Records

On the Paging Channel, information records may be included in the *Feature Notification Message*. On the Forward Traffic Channel, information records may be included in the *Alert with Information Message* and the *Flash with Information Message*. Table 7.7.5-1 lists the information record type values that may be used with each message type. The following sections describe the contents of each of the record types in detail.

**Table 7.7.5-1. Information Record Types**

Feature	Alert	Flash	Information Record	Record Type (binary)
Y	Y	Y	Display	00000001
Y	Y	Y	Called Party Number	00000010
Y	Y	Y	Calling Party Number	00000011
N	N	Y	Connected Number	00000100
Y	Y	Y	Signal	00000101
Y	N	Y	Message Waiting	00000110
All other record type values are reserved.				

## 1 7.7.5.1 Display

2 This information record allows the network to supply display information that may be  
3 displayed by the mobile station. The base station shall use the following variable-length  
4 format for the type-specific fields:

Type-Specific Field	Length (bits)
One or more occurrences of the following field:	
CHAR	8

5

6

7

8

9

10

11

12

13

CHAR - Character.

The base station shall include one occurrence of this field for each character to be displayed. The base station shall set each occurrence of this field to the ASCII representation corresponding to the character entered, as specified in ANSI X3.4, with the most significant bit set to '0'.

### 7.7.5.2 Called Party Number

This information record identifies the called party's number. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4

Zero or more occurrences of the following field:

CHAR	8
------	---

RESERVED	1
----------	---

**NUMBER\_TYPE** - Type of number.

The base station shall set this field to the NUMBER\_TYPE value shown in Table 6.7.1.3.2.4-2 corresponding to the type of the called number, as defined in ANSI T1.607 §4.5.9.

**NUMBER\_PLAN** - Numbering plan.

The base station shall set this field to the NUMBER\_PLAN value shown in Table 6.7.1.3.2.4-3 corresponding to the numbering plan used for the called number, as defined in ANSI T1.607 §4.5.9.

**CHAR** - Character.

The base station shall include one occurrence of this field for each character in the called number. The base station shall set each occurrence of this field to the ASCII representation corresponding to the character, as specified in ANSI X3.4, with the most significant bit set to '0'.

**RESERVED** - Reserved bits.

The base station shall set this field to '0'.

### 7.7.5.3 Calling Party Number

This information record identifies the calling party's number. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4
PI	2
SI	2

Zero or more occurrences of the following field:

CHAR	8
------	---

RESERVED	5
----------	---

**NUMBER\_TYPE** - Type of number.

The base station shall set this field to the NUMBER\_TYPE value shown in Table 6.7.1.3.2.4-2 corresponding to the type of the calling number, as defined in ANSI T1.607 §4.5.9.

**NUMBER\_PLAN** - Numbering plan.

The base station shall set this field to the NUMBER\_PLAN value shown in Table 6.7.1.3.2.4-3 corresponding to the numbering plan used for the calling number, as defined in ANSI T1.607 §4.5.9.

**PI** - Presentation indicator.

This field indicates whether or not the calling number should be displayed.

The base station shall set this field to the PI value shown in Table 6.7.4.4-1 corresponding to the presentation indicator, as defined in ANSI T1.607 §4.5.9.

**SI** - Screening indicator.

This field indicates how the calling number was screened.

The base station shall set this field to the SI value shown in Table 6.7.4.4-2 corresponding to the screening indicator value, as defined in ANSI T1.607 §4.5.9.

- 1                   CHARI - Character.
- 2                   The base stations shall include one occurrence of this field for
- 3                   each character in the calling number. The base station shall
- 4                   set each occurrence of this field to the ASCII representation
- 5                   corresponding to the character, as specified in ANSI X3.4,
- 6                   with the most significant bit set to '0'.
- 7                   RESERVED - Reserved bits.
- 8                   The base station shall set this field to '00000'.



#### 7.7.5.4 Connected Number

This information record identifies the responding party to a call. The base station shall use the following variable-length format for the type-specific fields:

Type-Specific Field	Length (bits)
NUMBER_TYPE	3
NUMBER_PLAN	4
PI	2
SI	2

Zero or more occurrences of the following field:

CHARI	8
-------	---

RESERVED	5
----------	---

**NUMBER\_TYPE** - Type of number.

The base station shall set this field to the **NUMBER\_TYPE** value shown in Table 6.7.1.3.2.4-2 corresponding to the type of the connected number, as defined in ANSI T1.607 §4.5.9.

**NUMBER\_PLAN** - Numbering plan.

The base station shall set this field to the **NUMBER\_PLAN** value shown in Table 6.7.1.3.2.4-3 corresponding to the numbering plan used for the connected number, as defined in ANSI T1.607 §4.5.9.

**PI** - Presentation indicator.

This field indicates whether or not the connected number should be displayed.

The base station shall set this field to the **PI** value shown in Table 6.7.4.4-1 corresponding to the presentation indicator, as defined in ANSI T1.607 §4.5.9.

**SI** - Screening indicator.

This field indicates how the connected number was screened.

The base station shall set this field to the **SI** value shown in Table 6.7.4.4-2 corresponding to the screening indicator value, as defined in ANSI T1.607 §4.5.9.

- 1                   CHARI - Character.
- 2                   The base station shall include one occurrence of this field for
- 3                   each character in the connected number. The base station
- 4                   shall set each occurrence of this field to the ASCII
- 5                   representation corresponding to the character, as specified in
- 6                   ANSI X3.4, with the most significant bit set to '0'.
- 7                   RESERVED - Reserved bits.
- 8                   The base station shall set this field to '00000'.

### 7.7.5.5 Signal

This information record allows the network to convey information to a user by means of tones and other alerting signals.

The Standard Alert is defined as SIGNAL\_TYPE = '10', ALERT\_PITCH = '00' and SIGNAL = '000001'.

The base station shall use the following fixed-length format for the type-specific fields:

Type-Specific Field	Length (bits)
SIGNAL_TYPE	2
ALERT_PITCH	2
SIGNAL	6
RESERVED	6

**SIGNAL\_TYPE** - Signal type.

The base station shall set this field to the signal type value shown in Table 7.7.5.5-1.

**Table 7.7.5.5-1. Signal Type**

Description	SIGNAL_TYPE (binary)
Tone signal	00
ISDN Alerting	01
IS-54B Alerting	10
Reserved	11

**ALERT\_PITCH** - Pitch of the alerting signal.

This field is ignored unless SIGNAL\_TYPE is '10'. IS-54B Alerting.

If SIGNAL\_TYPE is '10', the base station shall set this field to the alert pitch shown in Table 7.7.5.5-2. Otherwise, the base station shall set this field to '00'.

Table 7.7.5.5-2. Alert Pitch

Description	ALERT_PITCH (binary)
Medium pitch (standard alert)	00
High pitch	01
Low pitch	10
Reserved	11

SIGNAL - Signal code.

The base station shall set this field to the specific signal desired. If SIGNAL\_TYPE is '00', the base station shall set this field as described in Table 7.7.5.5-3. If SIGNAL\_TYPE is '01', the base station shall set this field as described in Table 7.7.5.5-4. If SIGNAL\_TYPE is '10', the base station shall set this field as described in Table 7.7.5.5-5.

Table 7.7.5.5-3. Tone Signals (SIGNAL\_TYPE = '00')

Description	SIGNAL (binary)
Dial tone on: a continuous 350 Hz tone added to a 440 Hz tone.	000000
Ring back tone on: a 440 Hz tone added to a 480 Hz tone repeated in a 2 s on, 4 s off pattern.	000001
Intercept tone on: alternating 440 Hz and 620 Hz tones, each on for 250 ms.	000010
Abbreviated intercept: alternating 440 Hz and 620 Hz tones, each on for 250 ms, repeated for four seconds.	000011
Network congestion (reorder) tone on: a 480 Hz tone added to a 620 Hz tone repeated in a 250 ms on, 250 ms off cycle.	000100
Abbreviated network congestion (reorder): a 480 Hz tone added to a 620 Hz tone repeated in a 250 ms on, 250 ms off cycle for four seconds.	000101
Busy tone on: a 480 Hz tone added to a 620 Hz tone repeated in a 500 ms on, 500 ms off cycle.	000110
Confirm tone on: a 350 Hz tone added to a 440 Hz tone repeated 3 times in a 100 ms on, 100 ms off cycle.	000111
Answer tone on: answer tone is not presently used in North American networks.	001000
Call waiting tone on: a 300 ms burst of 440 Hz tone.	001001
Tones off	111111
All other SIGNAL values are reserved	

Table 7.7.5.5-4. ISDN Alerting (SIGNAL\_TYPE = '01')

Description	SIGNAL (binary)
Normal Alerting: 2.0 s on, 4.0 s off, repeating	000000
Intergroup Alerting: 0.8 s on, 0.4 s off, 0.8 s on, 4.0 s off, repeating	000001
Special/Priority Alerting: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 4.0 s off, repeating	000010
Reserved (ISDN Alerting pattern 3)	000011
"Ping ring": single burst of 500 ms	000100
Reserved (ISDN Alerting pattern 5)	000101
Reserved (ISDN Alerting pattern 6)	000110
Reserved (ISDN Alerting pattern 7)	000111
Alerting off	001111
All other SIGNAL values are reserved	

Table 7.7.5.5-5. IS-54B Alerting (SIGNAL\_TYPE = '10')

Description	SIGNAL (binary)
No Tone: Off	000000
Long: 2.0 s on, 4.0 s off, repeating (standard alert)	000001
Short-Short: 0.8 s on, 0.4 s off, 0.8 s on, 4.0 s off, repeating	000010
Short-Short-Long: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 4.0 s off, repeating	000011
Short-Short-2: 1.0 s on, 1.0 s off, 1.0 s on, 3.0 s off, repeating.	000100
Short-Long-Short: 0.5 s on, 0.5 s off, 1.0 s on, 0.5 s off, 0.5 s on, 3.0 s off, repeating.	000101
Short-Short-Short-Short: 0.5 s on, 0.5 s off, 0.5 s on, 0.5 s off, 0.5 s on, 0.5 s off, 0.5 s on, 2.5 s off, repeating.	000110
PBX Long: 1.0 s on, 2.0 s off, repeating.	000111
PBX Short-Short: 0.4 s on, 0.2 s off, 0.4 s on, 2.0 off, repeating.	001000
PBX Short-Short-Long: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.8 s on, 1.0 s off, repeating.	001001
PBX Short-Long-Short: 0.4 s on, 0.2 s off, 0.8 s on, 0.2 s off, 0.4 s on, 1.0 s off, repeating.	001010
PBX Short-Short-Short-Short: 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.4 s on, 0.2 s off, 0.4 s on, 0.8 s off, repeating.	001011
All other SIGNAL values are reserved	

2

3

4

RESERVED

Reserved bits.

The base station shall set this field to '000000'.

## 1 7.7.5.6 Message Waiting

2 This information record conveys to the user the number of messages waiting. The base  
3 station shall use the following fixed-length format for the type-specific fields:

Type-Specific Field	Length (bits)
MSG_COUNT	8

4  
5  
6 MSG\_COUNT - Number of waiting messages.

7 The base station shall set this field to the number of messages  
8 waiting.  
9



1

2

3 No text.

4

1 **APPENDIX A MESSAGE ENCRYPTION AND VOICE PRIVACY**

2 This appendix and any modifications to this appendix are available as a separate document  
3 whose distribution is controlled by TIA.

4 The availability of this appendix is governed under the U.S. International Traffic and Arms  
5 Regulation (ITAR) and the Export Administration Regulations. TIA is the focal point and  
6 facilitator for making such information available. Procedures for distribution of this  
7 information are in the applicable Technology Transfer Control Plan. The Technology  
8 Transfer Control Plan is available from TIA.

9

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1

2

3 No text.

4

# APPENDIX B CDMA CALL FLOW EXAMPLES

This appendix contains examples of call flow. The diagrams follow these conventions:

- All messages are received without error
- Receipt of messages is not shown except in the handoff examples
- Acknowledgements are not shown
- Optional authentication procedures are not shown
- Optional private long code transitions are not shown

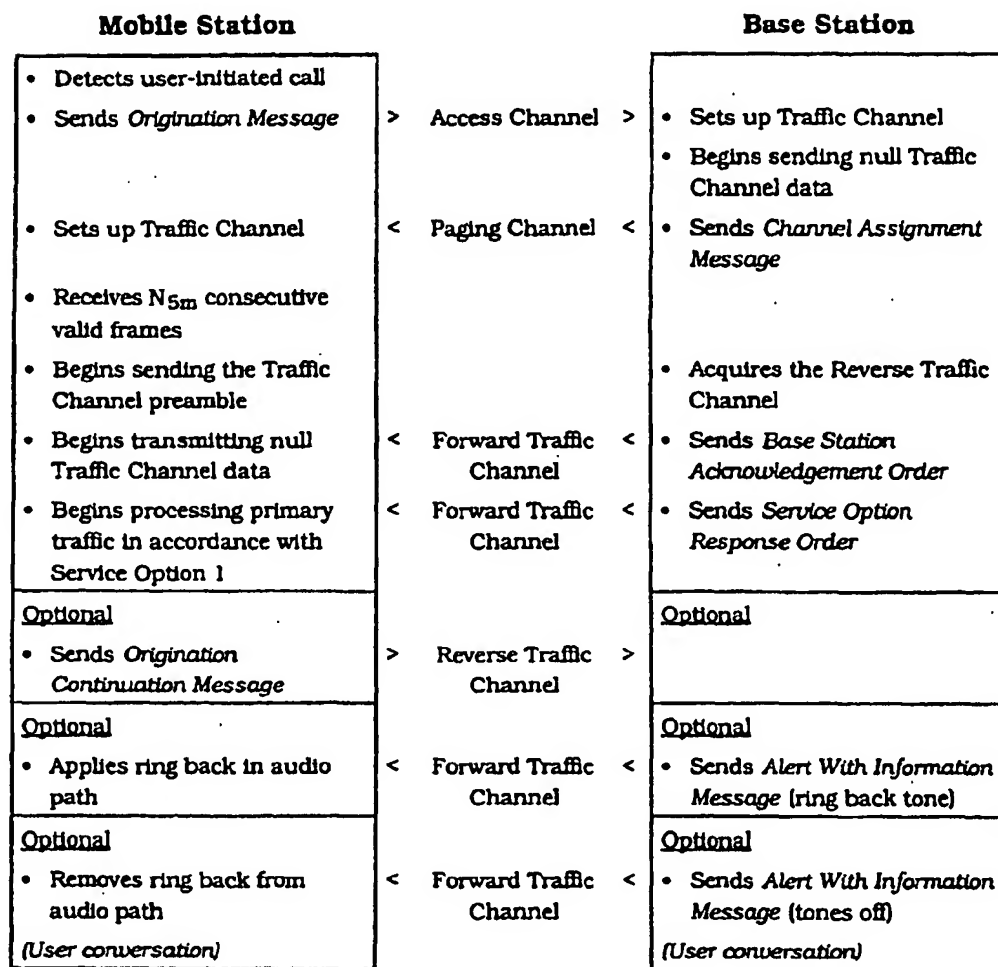


Figure B-1. Simple Call Flow, Mobile Station Origination Example Using Service Option 1

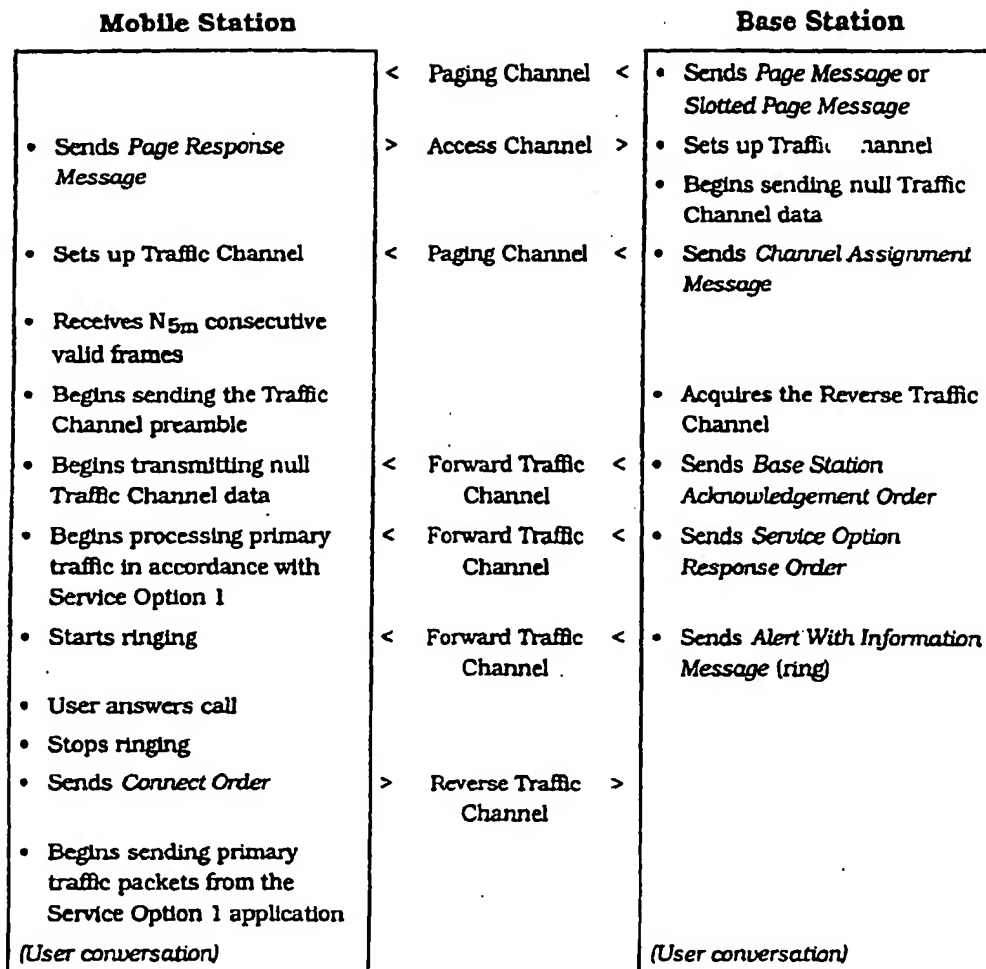


Figure B-2. Simple Call Flow, Mobile Station Termination Example Using Service Option 1

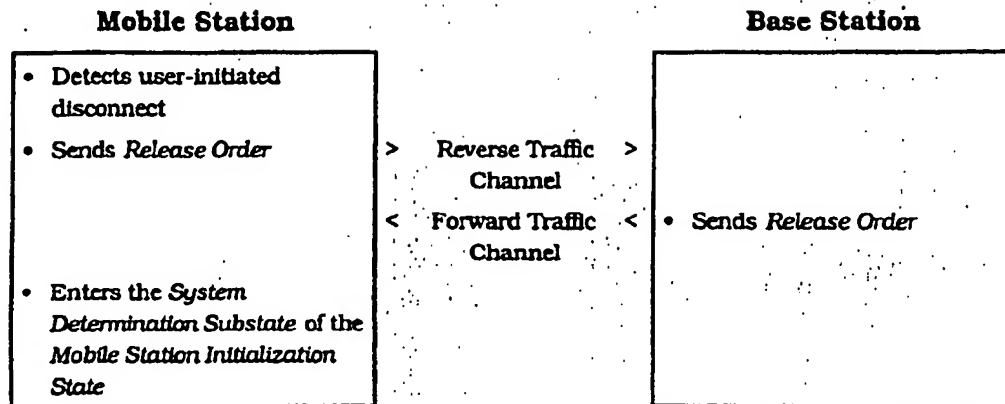


Figure B-3. Simple Call Flow, Mobile Station Initiated Call Disconnect Example

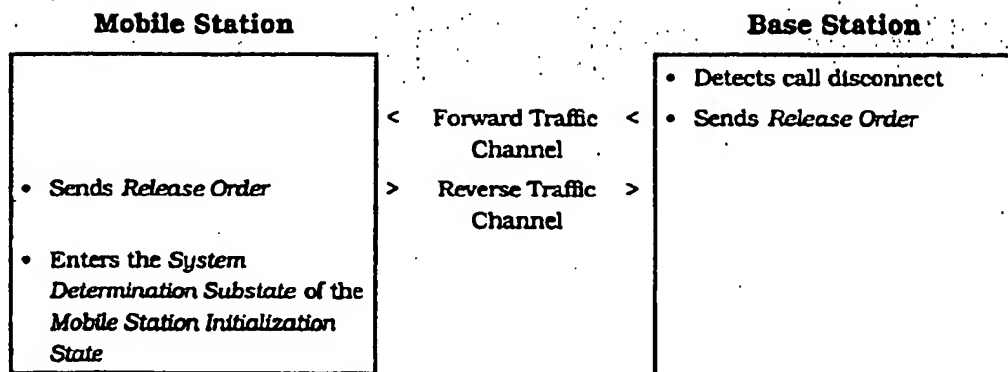


Figure B-4. Simple Call Flow, Base Station Initiated Call Disconnect Example

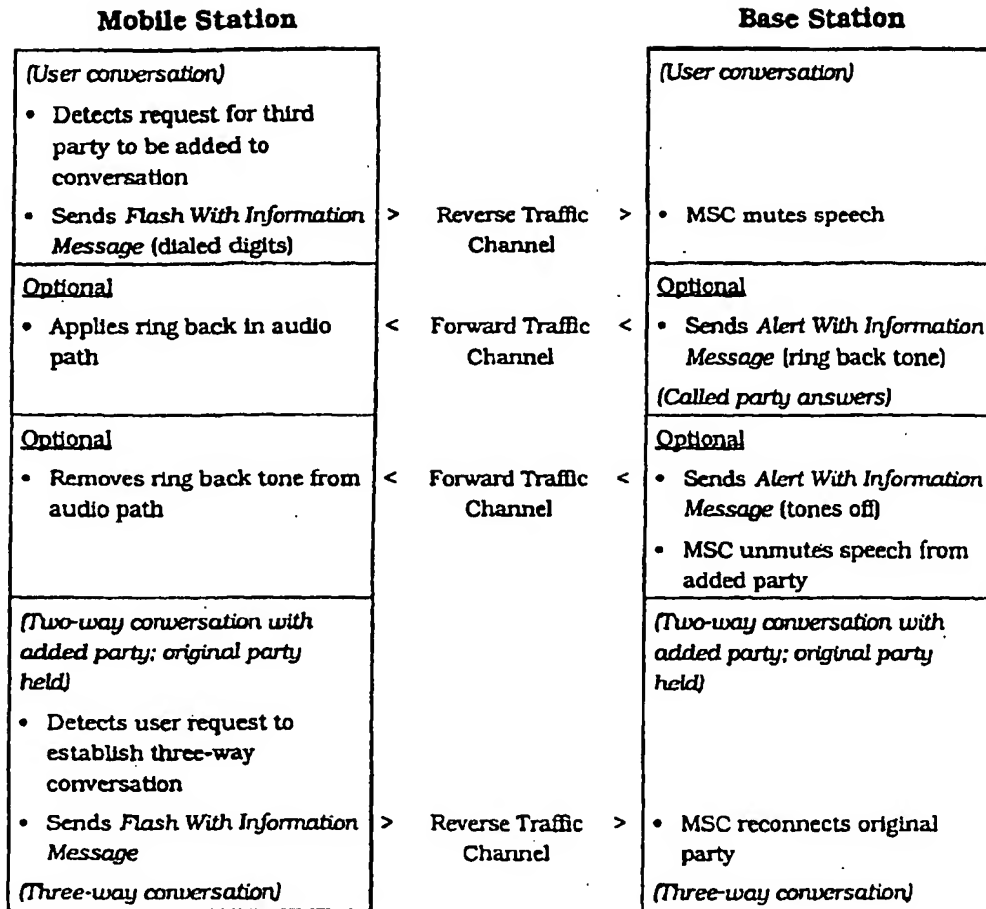


Figure B-5. Simple Call Flow, Three-Party Calling Example

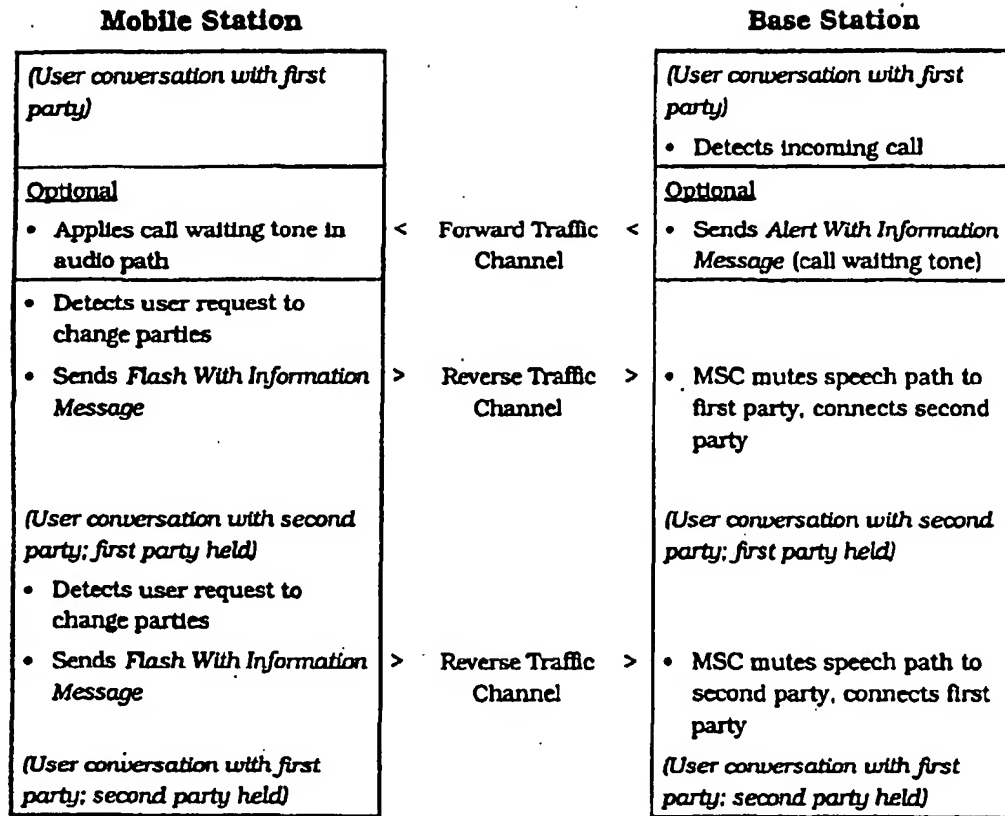


Figure B-6. Simple Call Flow, Call-Waiting Example

Figure B-7 illustrates call processing operations during a soft handoff from base station A to base station B. Figure B-8 illustrates call processing operations during a sequential soft handoff in which the mobile station is transferred from a pair of base stations A and B through a pair of base stations B and C to base station C.



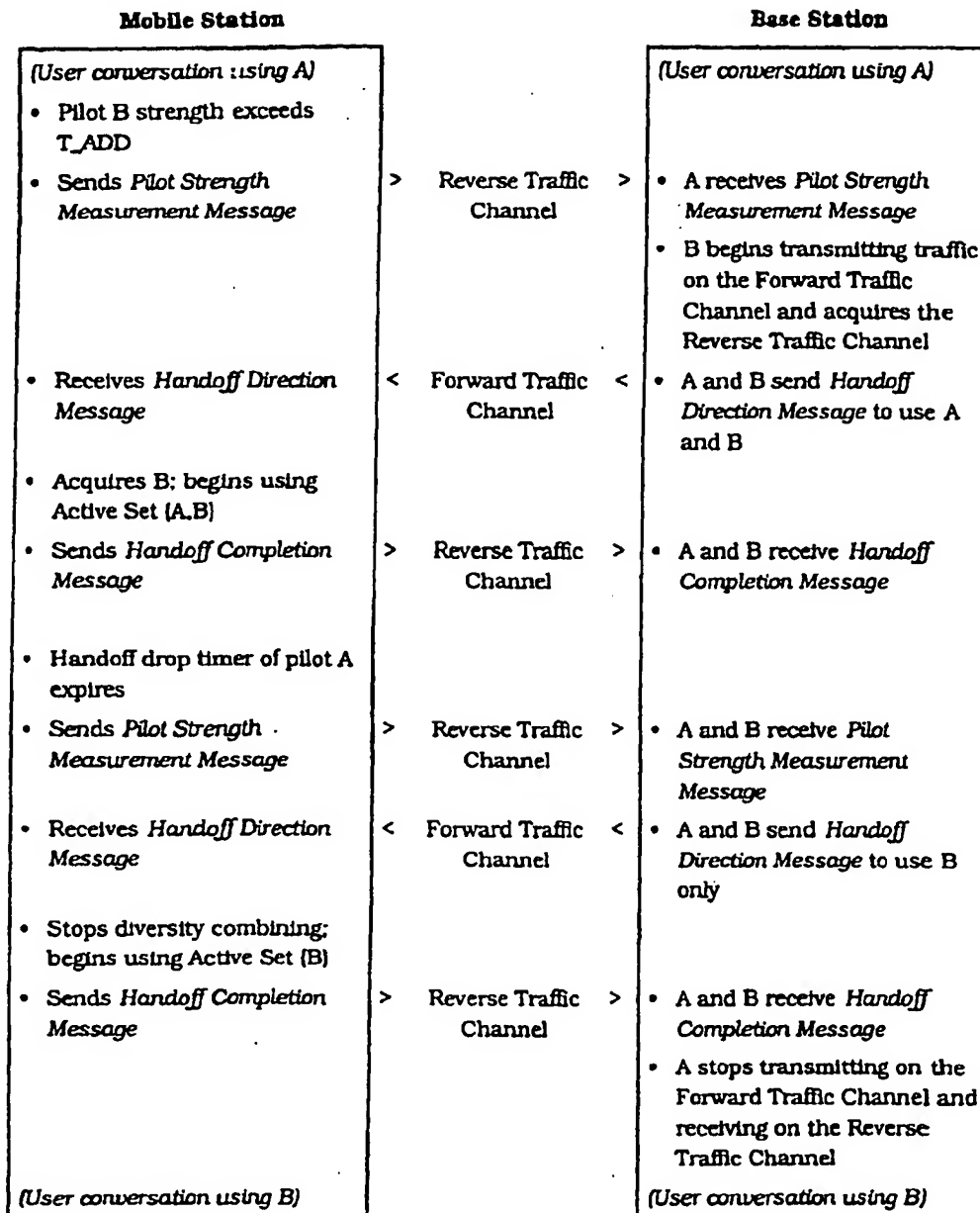


Figure B-7. Call Processing During Soft Handoff

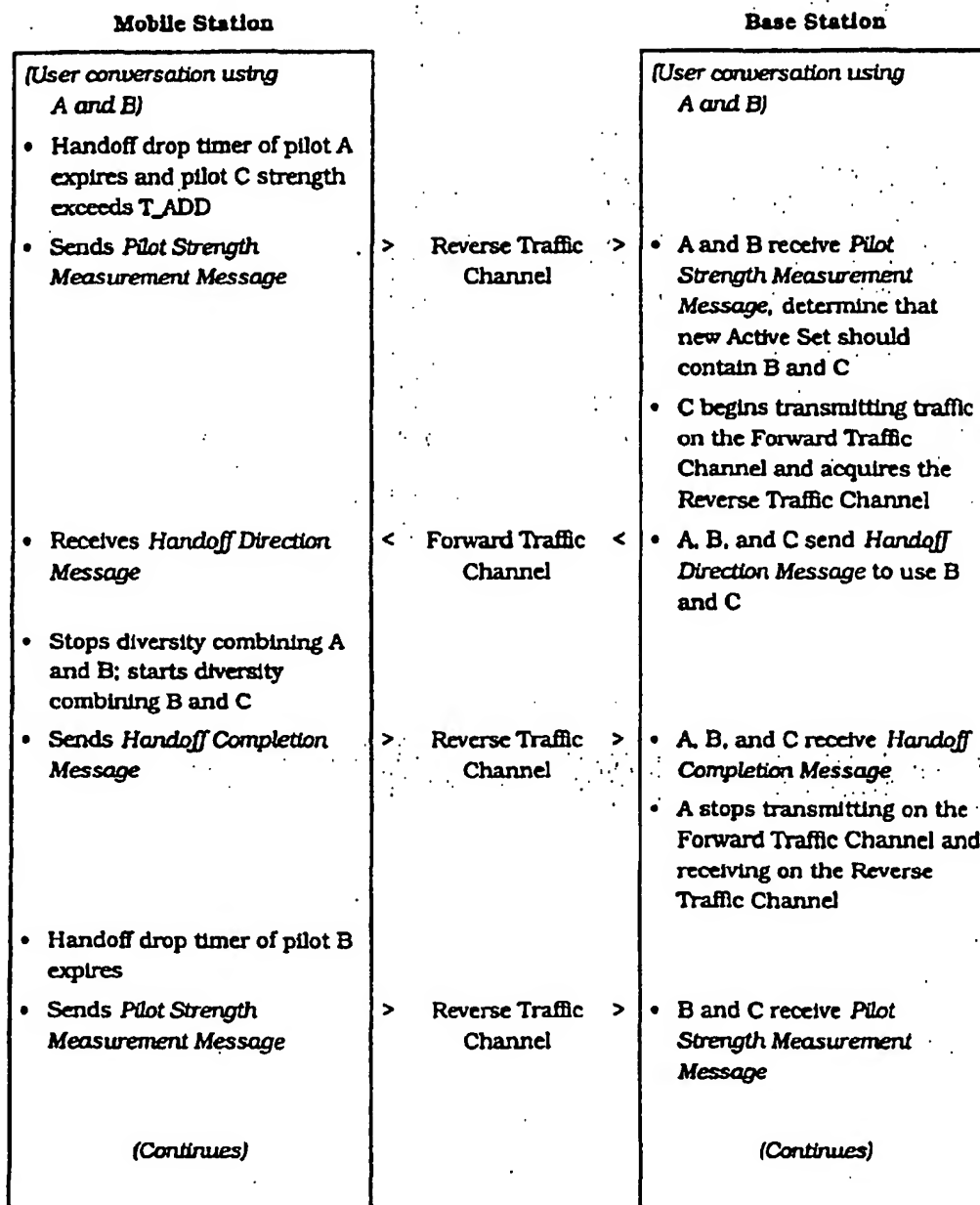


Figure B-8. Call Processing During Sequential Soft Handoff (Part 1 of 2)

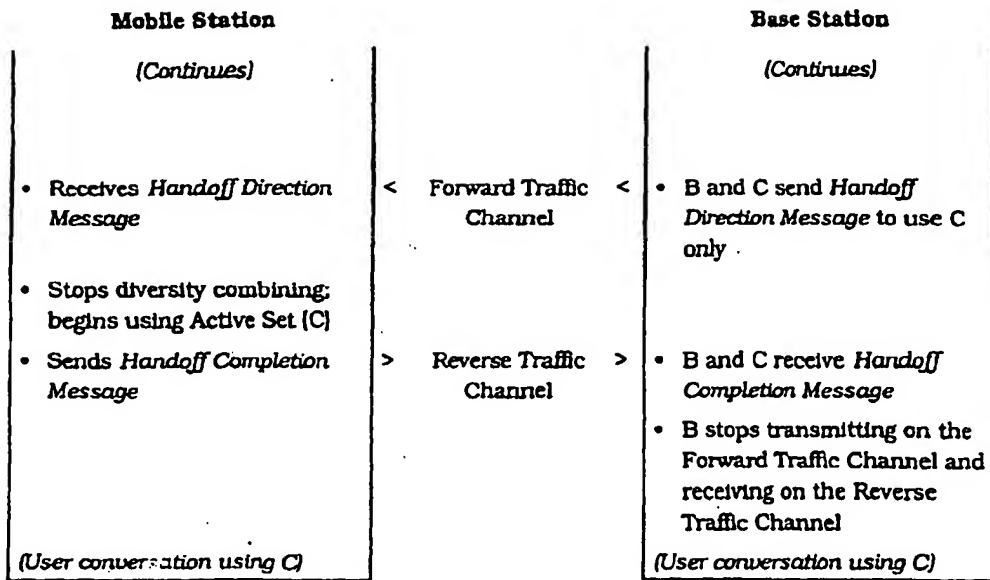


Figure B-8. Call Processing During Sequential Soft Handoff (Part 2 of 2)

# APPENDIX C PROTOCOL LAYERING

Figure C-1 shows a simplified logical view of the CDMA protocol structure for the Paging Channel, Access Channel, Forward Traffic Channel and Reverse Traffic Channel. This protocol is divided into conceptual layers. Layer 1 is the physical layer of the digital radio channel, including those functions associated with the transmission of bits, such as modulation, coding, framing, and channelization via radio waves. Between Layer 1 and Layer 2 is a Multiplex Sublayer containing the multiplexing functions that allow sharing of the digital radio channel for user data and signaling processes.

For user data, protocol layering above the Multiplex Sublayer is service option dependent and, where used, will be described in standards for the service options.

For the signaling protocol described in this standard, two higher layers are defined. Signaling protocol Layer 2 is the protocol associated with the reliable delivery of signaling Layer 3 messages between the base station and the mobile station, such as message retransmission and duplicate detection. Signaling Layer 3 is the protocol associated with call processing, radio channel control, and mobile station control, including call setup, handoff, power control, and mobile station lockout.

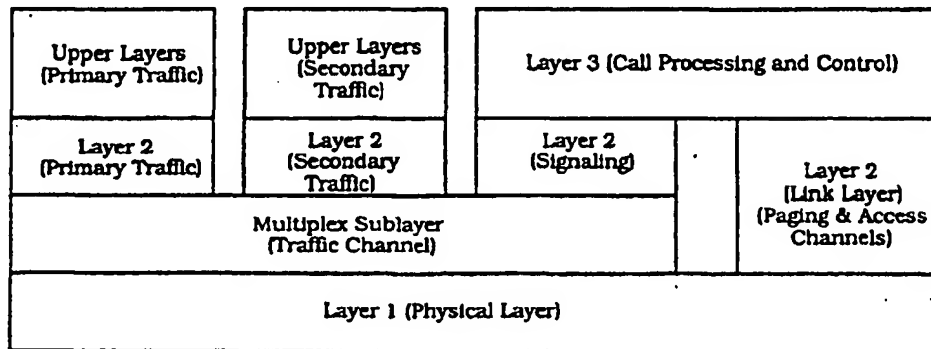


Figure C-1. Mobile Station and Base Station Layers

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3 No text.

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**1 APPENDIX D CDMA CONSTANTS****2 The following tables provide values for identifiers given in the text:****3 Table D-1. Time Limits****4 Table D-2. Other Constants****5**

Table D-1. Time Limits (Part 1 of 3)

Time Limit	Description	Value	References
T <sub>1m</sub>	Maximum time the mobile station waits for an acknowledgement	0.4 s	6.6.4.1.3.1.1 7.6.4.1.3.1.2
T <sub>2m</sub>	Maximum time allowed for the mobile station to send an acknowledgement	0.2 s	6.6.4.1.3.1.2
T <sub>3m</sub>	Period in which two messages received by the mobile station on the Forward Traffic Channel, not requiring an acknowledgement, and carrying the same sequence numbers, are considered duplicates	0.32 s	6.6.4.1.3.2 7.6.4.1.3.2
T <sub>4m</sub>	Period in which two messages received by the mobile station on the same Paging Channel and carrying the same sequence numbers are considered duplicates	2.2 s	6.6.2.1.2 7.6.2.1.4 7.6.3.1.1
T <sub>5m</sub>	Limit of the Forward Traffic Channel fade timer	5 s	6.4.4
T <sub>20m</sub>	Maximum time to remain in the <i>Pilot Channel Acquisition Substate</i> of the <i>Mobile Station Initialization State</i>	15 s	6.6.1.2
T <sub>21m</sub>	Maximum time to receive a valid Sync Channel message	1 s	6.6.1.3
T <sub>30m</sub>	Maximum time to receive a valid Paging Channel message	3 s	6.4.3
T <sub>31m</sub>	Maximum time for which configuration parameters are considered valid	600 s	6.6.2.2
T <sub>32m</sub>	Maximum time to enter the <i>Update Overhead Information Substate</i> of the <i>System Access State</i> to respond to an <i>SSD Update Message</i> , <i>BS Challenge Confirmation Order</i> , and <i>Authentication Challenge Message</i>	5 s	6.6.2.4 6.6.4
T <sub>33m</sub>	Maximum time to enter the <i>Update Overhead Information Substate</i> of the <i>System Access State</i> to respond to messages received while in the <i>Mobile Station Idle State</i> (except authentication messages)	0.3 s	6.6.2 6.6.5.5.2.3
T <sub>34m</sub>	Maximum time to enter the <i>Update Overhead Information Substate</i> or the <i>Mobile Station Idle State</i> after receiving a <i>Channel Assignment Message</i> with <i>ASSIGN_MODE<sub>r</sub></i> equal to '001'	3 s	6.6.3.3

Table D-1. Time Limits (Part 2 of 3)

Time Limit	Description	Value	References
T <sub>40m</sub>	Maximum time to receive a valid Paging Channel message before aborting an access attempt	1 s	6.4.3
T <sub>41m</sub>	Maximum time to obtain updated overhead messages arriving on the Paging Channel	4 s	6.6.3.2
T <sub>42m</sub>	Maximum time to receive a delayed layer 3 response following the receipt of an acknowledgement for an access probe	12 s	6.6.3.1.1.2 6.6.3.3 6.6.3.5
T <sub>50m</sub>	Maximum time to obtain N <sub>5m</sub> consecutive good Forward Traffic Channel frames when in the <i>Traffic Channel Initialization Substate</i> of the <i>Mobile Station Control on the Traffic Channel State</i>	0.2 s	6.6.4.2
T <sub>51m</sub>	Maximum time for the mobile station to receive a <i>Base Station Acknowledgement Order</i> when in the <i>Traffic Channel Initialization Substate</i> of the <i>Mobile Station Control on the Traffic Channel State</i>	2 s	6.6.4.2
T <sub>52m</sub>	Maximum time to receive a message in the <i>Waiting for Order Substate</i> of the <i>Mobile Station Control on the Traffic Channel State</i> that transits the mobile station to a different substate or state	5 s	6.6.4.3.1
T <sub>53m</sub>	Maximum time to receive a message in the <i>Waiting for Mobile Station Answer Substate</i> of the <i>Mobile Station Control on the Traffic Channel State</i> that transits the mobile station to a different substate or state	65 s	6.6.4.3.2
T <sub>54m</sub>	Maximum time for the mobile station to send an <i>Origination Continuation Message</i> upon entering the <i>Conversation Substate</i> of the <i>Mobile Station Control on the Traffic Channel State</i>	0.2 s	6.6.4.4
T <sub>55m</sub>	Maximum time to receive a message in the <i>Release Substate</i> of the <i>Mobile Station Control on the Traffic Channel State</i> that transits the mobile station to a different substate or state	2 s	6.6.4.5
T <sub>56m</sub>	Default maximum time to respond to a received message or order on the Forward Traffic Channel	0.2 s	6.6.4 6.6.6
T <sub>57m</sub>	Limit of the power-up registration timer	20 s	6.6.5.1.1 6.6.5.5.1.3
T <sub>58m</sub>	Maximum time for the mobile station to respond to a service option request	5 s	6.6.4.1.2.2



Table D-1. Time Limits (Part 3 of 3)

Time Limit	Description	Value	References
T59m	Reserved		
T60m	Maximum time to execute a hard handoff involving a new frequency assignment using the same base station	0.06 s	6.6.6.2.8
T61m	Maximum time to execute a hard handoff involving a new frequency assignment using a different base station	0.08 s	6.6.6.2.8
T62m	Maximum time to execute a hard handoff involving the same frequency assignment	0.02 s	6.6.6.2.8
T63m	Maximum time to execute a CDMA to Analog handoff	0.1 s	6.6.6.2.9
T64m	Maximum time to wait for a <i>Base Station Challenge Confirmation Order</i>	10 s	6.3.12.1.9
T65m	Reserved		
T66m	Reserved		
T67m	Reserved		
T68m	Reserved		
T69m	Reserved		
T1b	Maximum period between subsequent transmissions of an overhead message on the Paging Channel by the base station	1.28 s	7.6.2.2
T2b	Maximum time for the base station to send a <i>Release Order</i> after receiving a <i>Release Order</i>	0.8 s	7.6.4
T3b	Minimum time the base station continues to transmit on a code channel after sending or receiving a <i>Release Order</i>	0.3 s	7.6.4.5
T4b	Maximum time for the base station to respond to a service option request	5 s	7.6.4.1.2.2.1

Table D-2. Other Constants

Constant	Description	Value	References
N <sub>1m</sub>	Maximum number of times that a mobile station transmits a message requiring an acknowledgement on the Reverse Traffic Channel	3	6.6.4.1.3.1.1 6.4.5.5
N <sub>2m</sub>	Number of received consecutive bad Forward Traffic Channel frames before a mobile station must disable its transmitter	12	6.4.4
N <sub>3m</sub>	Number of received consecutive good Forward Traffic Channel frames before a mobile station is allowed to re-enable its transmitter after disabling its transmitter	2	6.4.4 6.6.6.2.8
N <sub>4m</sub>	Reserved		
N <sub>5m</sub>	Number of received consecutive good Forward Traffic Channel frames before a mobile station is allowed to enable its transmitter after entering the <i>Traffic Channel Initialization Substate</i> of the <i>Mobile Station Control on the Traffic Channel State</i>	2	6.6.4.2
N <sub>6m</sub>	Supported Traffic Channel Active Set size	6	6.6.6.2.6.1 7.6.6.2.2.2
N <sub>7m</sub>	Supported Traffic Channel Candidate Set size	5	6.6.6.2.6.2
N <sub>8m</sub>	Minimum supported Neighbor Set size	20	6.6.2.1.4.1 6.6.2.2.3 6.6.6.2.6.3 7.6.6.2.1.2
N <sub>9m</sub>	Minimum supported zone list size	7	6.6.5.1.5
N <sub>10m</sub>	SID/NID list size	4	6.6.5
N <sub>11m</sub>	Number of received consecutive good Forward Traffic Channel frames before a mobile station re-enables its transmitter after disabling its transmitter during a CDMA to CDMA Hard Handoff	1	6.6.6.2.8

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2 No text

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# APPENDIX E CDMA RETRIEVABLE AND SETTABLE PARAMETERS

This appendix describes the parameters that can be retrieved and set in the mobile station using the *Retrieve Parameters Message*, the *Parameters Response Message*, and the *Set Parameters Message*.

PARAMETER\_ID values from 0 through 32767 are reserved for definition by this standard and should not be defined by mobile station manufacturers. PARAMETER\_ID values from 32768 through 65535 may be defined by mobile station manufacturers.

Table E-1. Retrievable and Settable Parameters (Part 1 of 2)

Parameter Identifier	Value of PARAMETER_ID (decimal)	Length (bits) (PARAMETER_LEN is Length - 1)	Support Required? (Y or N)	Settable Parameter? (Y or N)	Reference Section
MUX1_REV_1	1	24	Y	Y	6.4.5.2
MUX1_REV_2	2	24	Y	Y	6.4.5.2
MUX1_REV_3	3	24	Y	Y	6.4.5.2
MUX1_REV_4	4	24	Y	Y	6.4.5.2
MUX1_REV_5	5	24	Y	Y	6.4.5.2
MUX1_REV_6	6	24	Y	Y	6.4.5.2
MUX1_REV_7	7	24	Y	Y	6.4.5.2
MUX1_REV_8	8	24	Y	Y	6.4.5.2
MUX1_REV_9	9	-	-	-	6.4.5.2
MUX1_REV_10	10	-	-	-	6.4.5.2
MUX1_REV_11	11	24	N	Y	6.4.5.2
MUX1_REV_12	12	24	N	Y	6.4.5.2
MUX1_REV_13	13	24	N	Y	6.4.5.2
MUX1_REV_14	14	24	N	Y	6.4.5.2
MUX1_FOR_1	15	24	Y	Y	6.4.5.4
MUX1_FOR_2	16	24	Y	Y	6.4.5.4
MUX1_FOR_3	17	24	Y	Y	6.4.5.4
MUX1_FOR_4	18	24	Y	Y	6.4.5.4
MUX1_FOR_5	19	24	Y	Y	6.4.5.4
MUX1_FOR_6	20	24	Y	Y	6.4.5.4
MUX1_FOR_7	21	24	Y	Y	6.4.5.4
MUX1_FOR_8	22	24	Y	Y	6.4.5.4

Table E-1. Retrievable and Settable Parameters (Part 2 of 2)

Parameter Identifier	Value of PARA-METER_ID (decimal)	Length (bits) (PARA-METER_LEN is Length - 1)	Support Required? (Y or N)	Settable Parameter? (Y or N)	Reference Section
MUX1_FOR_9	23	24	Y	Y	6.4.5.4
MUX1_FOR_10	24	24	Y	Y	6.4.5.4
MUX1_FOR_11	25	24	N	Y	6.4.5.4
MUX1_FOR_12	26	24	N	Y	6.4.5.4
MUX1_FOR_13	27	24	N	Y	6.4.5.4
MUX1_FOR_14	28	24	N	Y	6.4.5.4
PAG_1	29	24	Y	Y	6.4.5.3
PAG_2	30	24	Y	Y	6.4.5.3
PAG_3	31	16	Y	Y	6.4.5.3
PAG_4	32	24	Y	Y	6.4.5.3
PAG_5	33	24	Y	Y	6.4.5.3
PAG_6	34	16	Y	Y	6.4.5.3
PAG_7	35	16	Y	Y	6.4.5.3
ACC_1	36	16	Y	Y	6.4.5.1
ACC_2	37	16	Y	Y	6.4.5.1
ACC_3	38	16	Y	Y	6.4.5.1
ACC_4	39	16	Y	Y	6.4.5.1
ACC_5	40	16	Y	Y	6.4.5.1
ACC_6	41	16	Y	Y	6.4.5.1
ACC_7	42	16	Y	Y	6.4.5.1
ACC_8	43	16	Y	Y	6.4.5.1
LAYER2_RTC1	44	16	Y	Y	6.4.5.5
LAYER2_RTC2	45	16	Y	Y	6.4.5.5
LAYER2_RTC3	46	16	Y	Y	6.4.5.5
LAYER2_RTC4	47	16	Y	Y	6.4.5.5
LAYER2_RTC5	48	16	Y	Y	6.4.5.5
OTHER_SYS_TIME	49	36	Y	N	6.4.5.6

### F.2.2 Semi-permanent Mobile Station Indicators

Semi-Permanent mobile station indicators are retained when the mobile station power is turned off. These indicators are associated with mobile station registration and lock. They are independent of the NAM in use. Analog indicators are listed in Table F.2.2-1. CDMA indicators are listed in Table F.2.2-2.

**Table F.2.2-1. Analog Semi-Permanent Mobile Station Indicators**

Indicator	Number of Bits	Where Defined	Notes
NXTREG <sub>s-p</sub>	21	2.3.4.1	
SID <sub>s-p</sub>	15	2.3.4.1	
LOCAID <sub>s-p</sub>	12	2.3.4.2	
PUREG <sub>s-p</sub>	1	2.3.4.2	

**Table F.2.2-2. CDMA Semi-Permanent Mobile Station Indicators**

Indicator	Number of Bits	Where Defined	Notes
ZONE_LIST <sub>s-p</sub>		6.3.4	
REG_ZONE <sub>s-p</sub>	12	6.3.4	
SID <sub>s-p</sub>	15	6.3.4	
NID <sub>s-p</sub>	16	6.3.4	
SID_NID_LIST <sub>s-p</sub>		6.3.4	
SID <sub>s-p</sub>	15	6.3.4	
NID <sub>s-p</sub>	16	6.3.4	
BASE_LAT_REG <sub>s-p</sub>	22	6.3.4	
BASE_LONG_REG <sub>s-p</sub>	23	6.3.4	
REG_DIST_REG <sub>s-p</sub>	11	6.3.4	
LCKRSN_P <sub>s-p</sub>	4	6.3.13	
MAINTRSN <sub>s-p</sub>	4	6.3.13	

### F.3 NAM Indicators

Each mobile station contains one or more NAMs. Table F.3-1 lists the permanent and semi-permanent values associated with each NAM.

**Table F.3-1. NAM Indicators**

Indicator	Number of Bits	Where Defined	Notes
PREF_MODE <sub>p</sub>	optional	2.3.10.2	Preferred mode: analog or CDMA. Mobile station manufacturer option.
CDMA_PREF_SERV <sub>p</sub>	optional	2.3.10.1	Preferred CDMA serving system: A or B.
ANALOG_PREF_SERV <sub>p</sub>	optional	2.3.10.1	Preferred analog serving system: A or B.
FIRSTCHP <sub>p</sub>	11	2.3.7	
A_KEY	64	2.3.12.1.8	See TSB50 "User Interface for Authentication Key Entry" for details of A-KEY entry into the mobile station.
SSD_A <sub>s-p</sub>	64	2.3.12.1.1	Shared Secret Data A
SSD_B <sub>s-p</sub>	64	2.3.12.1.1	Shared Secret Data B
COUNT <sub>s-p</sub>	6	2.3.12.1.3	Call History Parameter
MIN1 <sub>p</sub>	24	2.3.1	
MIN2 <sub>p</sub>	10	2.3.1	
MCC <sub>p</sub>	10	6.3.1.3	
IMSI_ADDR_NUM <sub>p</sub>	3	6.3.1	
IMSI_11_12 <sub>p</sub>	7	6.3.1.2	
IMSI_S <sub>p</sub>	34	6.3.1.1	Includes IMSI_S1 <sub>p</sub> , 24 bits, and IMSI_S2 <sub>p</sub> , 10 bits, which may be shared with MIN1 <sub>p</sub> and MIN2 <sub>p</sub> , respectively.
HOME_SID <sub>p</sub>	15	2.3.8	
SID <sub>p</sub>	15	6.3.8	
NID <sub>p</sub>	16	6.3.8	
ACCOLC <sub>p</sub>	4	2.3.5	
EX <sub>p</sub>	1	2.3.6	
MOB_TERM_HOME <sub>p</sub>	1	6.3.8	
MOB_TERM_FOR_SID <sub>p</sub>	1	6.3.8	
MOB_TERM_FOR_NID <sub>p</sub>	1	6.3.8	

1   **APPENDIX F MOBILE STATION DATABASE**

2   **F.1 Introduction**

3   This appendix lists the numeric indicators that are described by this document and stored  
4   in the mobile station's permanent or semi-permanent memory. Some of these indicators  
5   are required; other indicators are optional and are so noted.

6   The indicators are organized in this appendix according to two categories:

- 7       • Mobile station indicators: These indicators are global to the mobile station and  
8       independent of the mobile station's NAMs.
- 9       • NAM indicators: These indicators specify parameters associated with the mobile  
10      station's NAM.

11   The description of each indicator below includes the indicator's name, the number of bits it  
12   contains, and the section in this document where it is defined. Permanent indicators are  
13   denoted by the "p" subscript; semi-permanent indicators are denoted by the "s-p" subscript.



## F.2 Mobile Station Indicators

Mobile station indicators are organized into permanent mobile station indicators and semi-permanent mobile station indicators.

### F.2.1 Permanent Mobile Station Indicators

Permanent mobile station indicators specify physical station configuration and attributes, independent of NAM. The indicators are listed in Table F.2-1.

**Table F.2-1. Permanent Mobile Station Indicators**

Indicator	Number of Bits	Where Defined	Notes
ESN	32	2.3.2	See 2.3.2 for special ESN storage and protection requirements.
SCM <sub>p</sub>	8	2.3.3	
SLOT_CYCLE_INDEX <sub>p</sub>	3	6.3.11	
MOB_P_REV <sub>p</sub>	8	6.3.14	
MOB_FIRM_REV <sub>p</sub>	16	6.3.14	
MOB_MODEL <sub>p</sub>	8	6.3.14	

**APPENDIX G BIBLIOGRAPHY**

This is an informative appendix. The documents listed in this appendix are for information only and are not essential for the completion of the requirements of this standard.

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